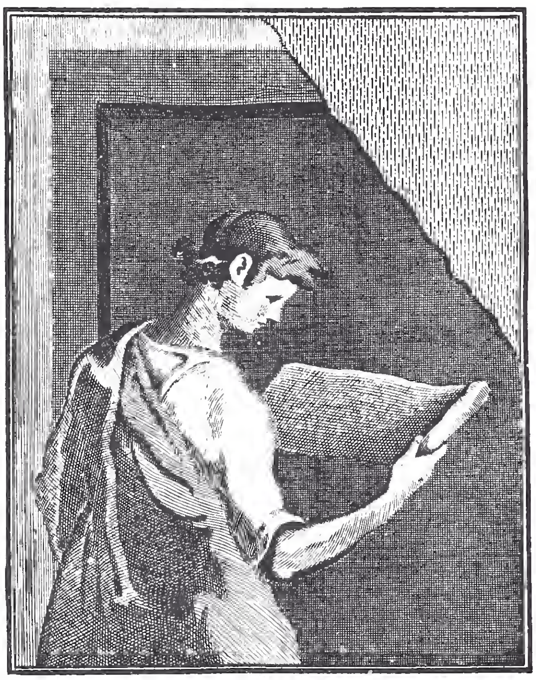

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PAPYROXYLINE FOR EMULSION WORK.

A fortnight ago we gave a preliminary account of some experiments in the manufacture of papyroxyline, undertaken with a view of obtaining a product specially adapted to emulsion work, and we have now to explain how far our object has been attained. As we had fully anticipated, from the general character of paper pyroxyline, but more especially from the very different conditions under which it is manufactured, its application to emulsion work presents some notable peculiarities which we have never encountered when using ordinary pyroxyline. We speak now of samples made under what we may term abnormal conditions, or with the conditions varied so as to produce special results; for it is possible to prepare a product which shall in no respect differ from that manufactured from raw cotton.

Thus, we have found that, though the general characteristic of papyroxyline is an almost total freedom from structure, it is possible by very slightly varying the conditions to produce a directly opposite result, and that the chemical or photographic properties of the product so obtained are eminently suited to the purpose we have in view, if only the modification in physical character of the film be not too great to render it unfit for use. The sample obtained from the formula described as No. 3 in our previous article is a case in point. Dissolved in similar proportions, and the collodion compared with that obtained from the other formulæ, the difference is striking; for No. 3 gives a solution having the appearance of containing but half as much cotton as either of the others. A tolerable quantity of sediment remains with No. 3, which is not the case with the others; but this would be insufficient to account for the difference in thickness. Nos. 1 and 2 flow smoothly, giving a film of some thickness and strength, and drying perfectly transparent and free from structure. No. 3 gives a thinner and more even-looking film previous to setting; but as it sets a sort of "chill" spreads evenly over the plate, commencing at the upper edge, and resembling the semi-opaque appearance of a plate coated with spirit varnish without heat, but more uniform in texture. When quite dry the film presents a smooth, opalescent appearance of some density, and perfectly free from grain; it adheres strongly to the plate, and if forcibly rubbed with the finger comes away in powder. When moistened its transparency returns.

But the greatest difference is noticeable in its behaviour during the process of emulsification. We were at first under the belief that No. 3 would prove to be incapable of holding the silver bromide in suspension, or, at least, that the formation of the latter salt would be so rapid that a coarse granular film would be produced. We were, consequently, much surprised to find a directly opposite result. Compared with Nos. 1 and 2, which when salted and sensitised with similar quantities of bromide and silver formed a rich, dense, ruby emulsion, it presents a totally different appearance. The silver bromide actually formed much more slowly on the thin collodion than on the thicker samples, and, after allowing more than twice the length of time for the completion of the sensitising, the No. 3 emulsion was still far thinner, more transparent, and of a peculiarly intense orange colour without a tinge of ruby.

Poured upon glass and washed, the first two samples gave films of rich colour and great density when dried. No. 3 while wet gave a very clear and transparent film, possessing great intensity of colour, rivalling in that respect a piece of dense orange glass; when dried, however, it became absolutely opaque, forming in the two stages the strongest possible contrast in appearance. The formation of the silver bromide in the sample of collodion appeared to exercise a very great effect upon its tenacity; for, unless the film be allowed to "set" very thoroughly before immersion in water the whole will be washed away in minute particles, just as we might expect in the case of a film of silver bromide without collodion or other matter to render it cohesive. When properly "set," however, the film is capable of withstanding any ordinary treatment, but will not bear much *rough* usage.

The working qualities of these three emulsions are very good, the image developing crisp and clear and full of detail, with a very short exposure. In all these cases density is obtained with the greatest ease either with alkali or silver, No. 3 surpassing the other two in this respect. When dried, however, the latter image becomes much more opaque, acquiring a density two or three times as great as when wet. This is not a merely trifling increase, such as may be noticed in the drying of any plate, but so great that detail which is little more than visible in the moist plate acquires almost sufficient density to form a high light. The transparent portions also assume the same opalescent appearance mentioned previously, and which seem to be identical in character with the phenomena described by M. Davanne in his communication to a recent meeting of the Photographic Society of France. Both the opalescence and the increased density disappear under the operation of varnishing—the former completely, the latter almost so. Moisture of any description has the same effect, which, however, ceases upon desiccation. We have not tried the effect of gelatine in removing this opalescence; but a strong solution of albumen (one part albumen to one of water) only partially destroys it, while its action upon acquired opacity of the image is feebler still.

We next turn our attention to the precipitation of the emulsion we have described, as in that is centered the chief interest of our experiments. We chose precipitation in contradistinction to washing, on account of the great saving both in time and trouble which it brings to the preparation of a washed emulsion, and because we believe that the future practice of that process lies in the direction indicated. We need not go minutely into the details of our mode of operation; suffice it to say that in each case we secured a good result, but properties of the various samples differed in some material points, chiefly bearing upon the physical properties of the collodion. Thus the films obtained from Nos. 1 and 2, after re-solution, exhibited a tendency to structure and to mottling. No. 1 appeared to have acquired a greater degree of glutinosity, with a tendency to flow in crapy lines. No. 2 flowed more smoothly but set very slowly, and great difficulty was experienced in preventing the film mottling at the instant of setting. No. 3 gave a most peculiar result; when poured upon glass a thin layer of powder absolutely without coherence was left, which while moist exhibited an orange colour, but, when dry, became opaque and showed no colour at all. From the nature of this emulsion previous to precipitation we had some doubt as to its capability of resisting the action of that operation, and took the precaution to divide it into two portions before redissolving; the second portion was now dissolved in plain collodion containing three grains of cotton to each ounce. The result was a beautiful emulsion without the slightest trace of grain or structure, and possessing the peculiar properties which marked the sample before precipitation.

The working properties of all the emulsions were but little altered in the process of precipitation; the same clearness and brilliancy of result were obtainable, and, in the case of the first two, no appreciable increase in the difficulty of obtaining density. With No. 3 the density appeared to be more easily attained, owing probably to the film containing a large quantity of sensitive material in proportion to the cotton. The dried film became opalescent, but not to such a degree as it had previously done, and unfortunately it showed a great tendency to drying marks.

We have gone thus minutely into the description of these samples of papyroxyline, because we think that a new power is developed in at least one of them. Moreover, we may say that the formulæ we have given are merely representative ones, selected from a large number of others giving, in a general way, corresponding results. The feature to which we wish to call special attention is the peculiarity of the results obtained with No. 3. It is obvious to the most inexperienced of our readers that the general properties of this sample do not recommend it as the basis of collodion for general work; but its peculiar action in emulsion fits it, we think, for use in connection with a sample of a different character.

Thus, we have employed No. 3 (or a sample corresponding to the description we have given) in several ways in combination with others. First, by mixing in certain proportions with a more horny sample in making the collodion; second, by adding a certain quantity of plain collodion prepared from a tough cotton to the emulsion made with No. 3 papyroxyline immediately previous to precipitation; and, thirdly, by using plain collodion in redissolving the pellicle as before stated. In each case we find we gain the full advantage of the organic nature of the papyroxyline.

It is possible that the same course may be adopted in the case of an extremely organic pyroxyline, but not, we think, with so much advantage. The conditions as regards both temperature and strength of acids are more easily conformed to when paper or similar material is used, besides which we have reason to believe that the product itself is more "organic" in its reactions owing to the peculiar re-arrangement of the various conditions of manufacture.

LIQUEFACTION OF OXYGEN.

We are able, in our first issue of the year, to announce a recent scientific achievement of startling interest which may not impossibly be ultimately of use to photographers. On the 22nd of December last oxygen was for the first time liquefied by M. Raoul Pictet.

Little more than a century has elapsed since the first discovery of this gas (by Priestley, in 1774), and vast has been the progress of science since that time. The whole modern structure of chemistry has been raised, and photography was then undreamt of. Gases at one time were looked upon as uncondensable vapours; but, within the century, first one and then another has given way to the persevering efforts of experimentalists, till at last the number of incompressible gases, by the liquefying of nitric oxide about a month ago by M. Cailletet, was reduced to three—oxygen, nitrogen, and hydrogen. Now that oxygen has succumbed two only remain unliquefied; and we may hope to look forward to the time when sufficient oxygen to make an enlargement by, or even to suffice for an evening's entertainment with a magic lantern, may be condensed sufficiently to be able to be carried in one's pocket.

We do not, of course, mean that the new process will enable us to obtain cheap liquid oxygen; but it generally happens in commerce that, whenever a substance has been made, readier and cheaper means are discovered for producing it in quantity. For example: we know that hyposulphite of soda can now be purchased at less per hundredweight than it cost per pound when its use in photography was first shown, and liquid sulphurous acid gas—at one time a chemical curiosity—is a recognised article of commerce. There are many other similar cases which we need not here repeat, and for this reason we are not without hope that liquid oxygen may be one of the usual *impedimenta* of the future magic lantern exhibitor.

We have said how, by degrees, the number of incompressible gases has been gradually diminishing. We owe to the illustrious Faraday the reduction to the liquid state of all known gases except the four we have named, with carbonic oxide and marsh gas. The method he employed was a combination of enormous pressure and extreme cold, further enhancement of the effects being produced by evaporation *in vacuo* of the cooling agent, a temperature of—110 being obtained with the air pump—76·6 in the open air. The extreme pressure was 50 atmospheres.

Since that time Professor Andrews has made important contributions to this branch of science; but even he did not succeed in liquefying either atmospheric air, oxygen, hydrogen, carbonic oxide, and nitric oxide with a cooling bath of liquid carbonic acid and ether as a temperature reducer, and at such enormous pressure as reduced their volumes respectively to $\frac{1}{675}$, $\frac{1}{554}$, $\frac{1}{500}$, $\frac{1}{278}$, and $\frac{1}{680}$ of their bulk.

It is remarkable that under the method so recently successful with oxygen neither the pressure nor the temperature of the cooling bath were so extreme as those we have just recorded, and hence we are quite justified in hoping that still improved methods of obtaining liquid oxygen may be discovered, for the incentive will be enormous now that it is known that the feat can be accomplished. It would be impossible to give a list of all the uses to which such a substance could be applied.

The process adopted by M. Raoul Pictet was designed rather differently from those usually employed, and is remarkably ingenious. The oxygen is made in a large generator of immense strength, so as to resist any pressure it would be subjected to, and is in form somewhat like a large shelf. The cooling agent is carbonic acid, which is liquefied under a pressure of four to six atmospheres and a temperature of 65°. It is conducted in this liquid state into a tube four meters long, and is then solidified by means of a vacuum produced by two combined pumps. Attached to the oxygen generator is a tube, narrower than the one named; it is passed through the tube of frozen carbonic acid, and the apparatus is then ready for use. The oxygen which has been kept confined in the vessel that generated it (thus allowing a pressure of 800 atmospheres, if necessary) has had its temperature reduced so as obtain the utmost cold. When the connection is complete the oxygen is turned on. The conditions thus carried out on the day named were—cold compressed oxygen ready to expand, and so produce a still lower temperature, passing through an extremely cold tube. When it reached the orifice it emerged as a jet of liquid, and the most remarkable product of modern ingenuity and perseverance was obtained.

The pressure was by no means great nor so extreme as had been obtained by other experimentalists with no success, as it only reached three hundred atmospheres. The temperature is not given in the account which has reached us, but it must have been remarkably low, for the carbonic acid was liquefied at 65° and then frozen in a vacuum, which would probably give the temperature Faraday obtained, as above stated; and, finally, the expansion under the atmospheric pressure only must have produced a still further reduction of temperature.

The experiments were to be repeated under slightly different conditions, and we look forward with great interest to further details of this most remarkable achievement.

RECENT PATENTS.

No. I.—PHOTOGRAPHIC PLATES FOR PRINTING.

In the following patent, which has been granted to Mr. William Howard Mumler, of Boston, United States of America, it will be seen that the leading feature consists in the substitution of acetic acid for hot water as a solvent of an impressed gelatine film, from which is eventually to be produced a surface block for printing.

Starting with an acknowledgment of what was effected by Mr. Mungo Ponton in 1839, and by M. Poitevin in 1855, in connection with the rendering of organic matter insoluble in water by its exposure to light when mixed with bichromate of potash, the present patentee, in order to impart a clear idea of his invention, gives a brief summary of the main features of the more prominent of the processes founded on the discoveries of the gentlemen named, and now in use:—

In photolithography and photozincography a transfer is made on stone or zinc by means of gelatine, and the printing is done from the surface of the stone or zinc by means of lithographic ink and a press.

In photogalvanography the gelatine film or plate after having the picture printed thereon, and the parts not acted upon the light swollen by water, is made to serve as the basis of electrotyping.

In the Woodburytype process a sheet of gelatine, from which the parts not acted upon by light have been washed away, is used as the means for obtaining by hydraulic pressure a metal mould. This mould is filled for every impression with gelatine containing colouring matter, and the print is really an embossing of coloured gelatine on the sheet of pager.

In photocollograhic printing, or the heliotype process, the printing is effected directly from the flat level surface of the sheet of gelatine in the same manner that lithographs are printed from stone, the superflous chemicals contained in those parts not previously acted upon by the light having been washed out without washing away the gelatine.

The patentee then continues:—

My improved process differs from all these processes, and will be best understood by a description of the various operations in detail which go to make up the complete process as follows:—In the preparation of the gelatine plate I use the following ingredients in about the proportions stated, namely, gelatine, one ounce; fresh water, seven ounces; glycerine, two drachms; saturated solution of bichromate of potash, two drachms. These ingredients are placed in a vessel and subjected to a gentle heat, and when thoroughly dissolved and mixed the mass is poured upon a smooth level metal or glass plate provided with ledges raised about one-fourth of an inch above its upper surface around its outer edge until the fluid mass is even with the tops of the said ledges, the surface of the said plate having been previously prepared by rubbing it with tallow to prevent the gelatine from adhering thereto. The plate with the gelatine thereon is then put away in a dark room to dry. When thoroughly dry the gelatine film is removed from the glass or metal plate, and placed under a photographic negative, and exposed to the light under the direct rays of the sun a sufficient length of time to print thereon a picture from the negative in contact therewith; it is removed from under the negative and secured to a base of glass, metal, or other suitable material, with the face or printed side uppermost, by means of liquid glue, or any other suitable adhesive material that can be used in a cold state. The upper surface is then made level and true by grinding the surface with emery paper or cloth, or other suitable abrading material attached to a block of wood or other suitable material having a true and level surface.

To prevent scratching by the emery or other abrading material I rub the surface with tallow until all the insterstices are filled. The plate of gelatine with the picture printed thereon is then treated with acetic acid by pouring it upon its upper surface, and brushing such surface with a soft bristle brush to assist the acid in dissolving the gelatine not acted upon by the light. Those parts acted upon by the light being rendered insoluble thereby are unaffected by the acid, and as a consequence are left in relief by the gradual dissolving or eating away of those parts not acted upon by the light. When a sufficient depth has been obtained, or when the acid has dissolved or eaten away the gelatine as deep as the light has penetrated (which effect is indicated by a slight curving or crooking of the straight lines), the acid must be immediately washed off with water at about blood-heat. If any trace of acid should remain it may be neutralised by exposing the plate to the fumes of ammonia.

If sufficient depth has not been obtained by this one treatment the instertices or parts eaten away by the acid may be filled or coated with a paste composed of mucilage or other suitable gum and bone black; or these parts may be coated with india ink, black shellac varnish, or any opaque or semi-transparent substance which will prevent the passage of the actinic rays of light through the same, and that may be readily removed again without injury to the gelatine plate.

Up to this time in my process all the operations upon the gelatine plate, except while under the negative, must be performed in a dark room or in an anti-actinic light. The plate covered or partially covered with the bone-black paste or other protective coating may now be exposed to the actinic light without the negative, the paste or other coating preventing the action of the light, except upon the lines left standing by the acid, and which are not covered by the paste.

This exposure may continue for an indefinite time, or until the raised lines become very hard, and the light has penetrated and acted upon the gelatine to a sufficient depth. The plate is then taken into the dark room again, where the paste or other coating is removed by a suitable solvent; for instance, if the paste of mucilage and bone black be used cold water will serve as the solvent, and if a varnish be used to hold the colouring matter, to render the coating opaque, alcohol should be used as the solvent. When this has been done the paste is again treated with acetic acid as before. The plate may then be dried in the light until it becomes hard in all its parts; it is then ready to electrotype in the same manner as a woodcut is electrotyped.

It is well known that the face surface of type, woodcuts, and other plates with which printing is to be done, must be true, straight, or level, in order that good work may be produced therefrom; but this result has never been fully or satisfactorily accomplished in any of the processes of producing prints by means of gelatine plates, for the reason that in removing the gelatine from the original surface on which it was dried, and fastening the same to its base, it is very difficult to preserve the level surface; and, moreover, the gelatine film when dry is not sure to be of an even thickness, its upper surface sometimes being very irregular and uneven.

Another difficulty heretofore encountered in experiments for the production of gelatine relief plates has been that the outer edges of the lines left standing in relief, after treating the plate with a solvent, turn or curve upward, and thereby destroy the even level surface thereof, the effect of which is to make the lines when printed rough and imperfect.

This difficulty is evidently occasioned by the partially insoluble nature of the outer crust or coating of the gelatine film, which, in all the heretofore known processes, is preserved intact. This outer crust is partially insoluble, and of a more contractile nature than the other portions of the plate.

To obviate these difficulties, and give to the gelatine plate a true, straight, and even surface, and prevent the turning up of the edges of the lines, I grind the face surface of the gelatine plate after the picture has been printed thereon, and after the gelatine film has been permanently secured to its base, as previously described.

Another great difficulty heretofore met with has been occasioned by the use of hot water as a solvent for the parts unaffected by the action of light in printing the picture on the gelatine plate, which has heretofore been the practice.

Gelatine has a great affinity for hot water, and is easily dissolved therein; and in using it to cut away the parts of the plate not acted upon by the light, the heat from the water penetrates the entire plate, and partially dissolves or softens the whole plate, and throws the lines out of shape.

To obviate this difficulty I use acetic acid in a cold state as a solvent. This acid affects the gelatine plate only so far as it has not been acted upon by actinic light, acetic acid having no effect upon bichromatised gelatine that has been exposed to the action of actinic light when said acid is used in a cold state; but in the same cold state the said acid is a very ready solvent of gelatine, however hard, if it has not been exposed to the action of actinic light, therefore the lines, however fine, are preserved intact, and kept from being thrown out of shape.

Having thus fully described the said invention as communicated to me by my foreign correspondent, and the manner of performing the same, I wish it understood that I claim—

First. The process, herein described, of obtaining level, straight, and true surfaces on gelatinous films, from which to produce relief plates for printing, by grinding the surface of the said film with emery cloth, or other suitable abrading material, properly extended upon and secured to a true flat surface of wood or other suitable material, as above described.

Second. The process of producing relief surfaces upon gelatine plates by photographing or printing from a photographic negative, the picture to be reproduced upon the surface of the said gelatine plate, grinding the surface of the plate either before or after printing thereon the picture, and then treating it with acetic acid in the manner herein set forth.

Third. The process, herein described, of producing gelatine relief plates by photographing or printing from a photographic "negative" or "positive" upon the surface of the gelatine plate the picture to be produced in relief, treating the plate with acetic acid until it has eaten away the gelatine to as great a depth as possible without injury to the lines, removing the acid and coating or filling the parts acted upon by the acid with a paste made of bone black and any suitable gum, or with indian ink, black shellac varnish, or other opaque or semi-transparent substance, then exposing the plate to the direct rays of light without the negative or positive plate, and, after removing the paste or other opaque or semi-transparent substance, treating the gelatine plate with acetic acid a second time, as above described.

Fourth. In the process of producing gelatine relief plates, treating the plate after a partial relief has been produced, with a coating of bone-black paste, indian ink, black shellac varnish, or other opaque or semi-transparent substance, in the manner herein described, for the purpose specified.

Fifth. The method of preventing the scratching of the surface of the gelatine plate by the emery or other abrading material, by filling the interstices of the abrading surface with tallow or equivalent material as above described.

While much ingenuity has been displayed in carrying out the details of this invention, we nevertheless entertain a decided opinion that superior methods for effecting the same ends have been published in this Journal. But to enter upon these at present would be foreign to our purpose. We may, however, state that, in this country at anyrate, glass plates can be coated with gelatine in a fluid form, which, when dry, will possess so much smoothness as to render it difficult to pronounce at first sight as to which side of the glass has been coated.

No. II.—PRODUCING COLOURED PHOTOGRAPHS.

It is only a few months since we gave a brief description of certain pictures that had been produced by Mr. Lombardi, in which effects similar to old oil paintings had been produced—still later we noticed Mr. J. Solomon's efforts in the same direction—without being able in either case to impart information regarding the *modus operandi*, beyond stating the fact in general terms that the photographs had been rendered transparent and the colours applied behind.

Unless we are greatly mistaken the reader will find in the following specification of a patent obtained by Herr Johannes Carl Schuhmacher, of Blasewitz, near Dresden, a somewhat detailed statement of the method by which "poikilographs" are produced, or, what amounts to the same thing, a method by which pictures having an appearance similar to those named may be produced:—

This invention consists in a method or process, hereinafter described, of producing coloured photographs, to which end the photograph before being mounted is made transparent by applying copal varnish on its reverse side; it is then, by applying retouch varnish on the same side, made capable of taking oil colour, which oil colour, when the photograph is viewed from the front, becomes perfectly apparent, whilst the shadows and transitions or gradations from shade to light of the photograph itself at the same time form the shadows and transitions or gradations from shade to light of the coloured photograph.

Since the introduction of the art of photography it has been the aim of photographers to produce coloured impressions, to which end innumerable means and manipulations have been resorted to. Nevertheless, until recently the coloured photographs produced have not met the standard of higher artistic pretensions.

By the present invention coloured photographs are produced in such manner as, when taken direct from good original paintings, to satisfy the most exacting requirements in an artistic point of view.

The photographic picture, as such, remains perfectly intact, so that faults in form and drawing will never occur, the colouring operator having merely to heed his colour. Hence, and by the peculiar degree of softness given to the colours by the photograph prepared as hereinafter described, pictures of surprising effect will be obtained with but little loss of time.

In describing the manipulation, hereinbefore referred to, for effecting the object of the invention, the patentee says:—"I soak the naked photograph on its reverse side (back) with marketable (commercial) West Indian copal varnish, which I previously warm up to 25° Reaumur, and which I dilute, in case of its being too thick or clotted, with French turpentine, so that the fluid can then be easily laid on by means of a brush. When this copal varnish, applied as described, has become dry, I take common saleable French retouch varnish and cover the same reverse side of the photograph with it, this laying on of retouch varnish being necessary to enable the now transparent photograph to take the oil colour. When this retouch varnish is dry, which takes but little time, the oil colour is laid on on the same reverse side of the picture without shades, and in most cases it will suffice to apply the oil colour in the tints of light. The shades and passages (gradations) from shade to light are completely returned (shown) by the photographic picture. After the drying of the oil paint another layer of copal varnish of the same quality as above is applied on to the same. When this varnish is also dry the photograph is mounted on cartoon paper or white canvas, by means of starch mixed with a little glue and common Venetian turpentine. I will here expressly remark that all the layers and colouring as described take place on the reverse side (back) of the photograph. The mounting on card-paper or canvas being accomplished, I finally varnish the front side of the photograph by means of copal varnish. The picture thus obtained reproduces all the pecularities of good old paintings, such as the marks of the brush of the artist, cracks in the varnish, and so on."

The special claim is the broad one of "the method of producing coloured photographs, as described."

While we gladly take advantage of the specification to obtain a description of the mode of working, we are unable to say that the method of producing coloured photographs herein described is new —at least in this country—and that therefore the patent would prove valid were legal measures resorted to in order to punish anyone for its infringement.

It is an almost superfluous task at the present time to attempt to write anything about a "new" preservative, as the inevitable result will be the subsequent discovery that it is *not* new. We shall, therefore, preface our description of a modified organifier by the simple statement that is not new in one sense, while it has claims to be considered so in another. Some little time ago we spoke of the action of a feebly-alkaline solution when applied to the sensitive film before exposure in assisting in the formation of a vigorous image, or in aiding in the acquirement of density. The ordinary coffee preservative, admirable though it is in most respects, fails with certain descriptions of plates to give such an amount of vigour as may in some subjects be desirable; hence we were led recently to attempt the combination of coffee with an alkali with results not only gratifying, but surpassing our expectations. The solution is simple and easily made. Take a tablespoonful of ground coffee and half a teaspoonful of bicarbonate of soda, and pour upon them a pint of boiling water, and, when cold, filter. The quantities given may be considered rather indefinite, but for all practical purposes are sufficiently accurate. Such a solution we have had in use for a period of five or six weeks without the appearance of any tendency to decomposition. It gives a plate possessing great sensitiveness (other conditions being favourable) and the usual delicacy and colour of coffee plates, with the additional advantage that full density may be obtained with the greatest ease either with ammonia or silver. We have tried the addition of gallic acid, but cannot recommend it, as, though it works very well when freshly prepared, a few hours suffice to bring about a complete change in its action.

THE ART OF PAINTING ON THE PHOTOGRAPHIC IMAGE.

No. XVI.

Autotypes may be excellently worked upon in black and white crayons by the following method:—Take two pieces of bath-brick and rub them together over your print, so as to cover it with an impalpable powder. Remove all large pieces, and then with the palm of the hand rub firmly but gently in a circular manner all over the autotype, until a mat surface is produced. Now (having carefully removed every trace of bath-brick) sprinkle over the surface powdered white chalk, which must be *briskly* rubbed in all over; then blow away all loose chalk, and you have a surface that will take crayon either from the stump or the crayon itself.

There are several different methods of using crayons. One is by using lines and dots only, and not using the stump at all, and very beautiful effects are got in that way. There are pencils sold which seem particularly adapted for the purpose; they are called "Binns' carbon pencils." Sometimes a slight suggestion of red in the cheeks and lips is introduced; this is best given by the natural red chalk. It does not look well to use too positive a red for this purpose.

The management of the cross-hatching and lines can be well studied from some of the excellent lithographed studies for two crayons sold in the shops, especially those by Julien. A soft, white crayon should be lightly touched on the high lights on nose, forehead, &c.; then the rest carefully cross-hatched, so managing the lines as to aid the rounding of the features. There is much art required in managing the drapery, and for this kind of finish vignettes are best. The drapery must be so lined as to match the face and keep up the character of a crayon drawing throughout; the background also gives great scope for taste.

If red be introduced it should be put on immediately after the white and before the black. If red be used it will also be requisite to give just a suggestion of the colour of the eye with a suitable crayon; such as are sold in round, upright card-boxes will suffice. Should the artist like a tint all over his paper, so as to get an effect somewhat like a Mulready study, a suitable tint may be got by dipping the autotype in a bath of a strong solution of coffee; or, if a bright straw colour be required, a decoction of saffron answers admirably. Perhaps Judson's dyes would answer, but I have not tried them.

Now that stumping is allowed in the schools of art it will probably become commoner than formerly. The stump is a short, round instrument pointed at both ends. Some of these are made of wash-leather, others of cork or paper. For general use a large wash-leather stump is the most useful; but the small cork ones are good for small, sharp touches. Sometimes, however, a piece of wash-leather folded over the forefinger is the most manageable, and if a photograph be lacking in half-tone, such a piece dipped in that very soft crayon known as "stumping sauce" may be made to do wonders. A tint should be taken all over the face, and the lights then removed with ink-eraser. Any unevenness in this tint may be removed or stippled out, as it were, with ink-eraser. The picture may then be finished off almost entirely with stumping or altogether with the crayon, or a combination of the two. J. Wake.

ON THE SAVING OF SILVER.

It is a trite saying that "it is not so much what a man earns as what he saves," and, as the margin for saving or wasting in photography is so large, the matter of saving becomes an important one.

It is well known among photographers that but a very small percentage of the silver used remains in the finished negative or print, and yet it is surprising to see how careless many are in their handling of the precious material, and how little effort is made to save where saving is possible, or where it is no more trouble to save than to waste.

Men are governed mainly, no doubt, by their interest in this matter, and unless one has had a thorough training in economical methods, or has a prospect of personal benefit in the result, he will waste as soon as save.

Most proprietors of galleries are disposed to practice saving, but the difficulty is in getting "helps" to look to their employer's interest in this direction, when it requires a little more care or an extra step to do it. The best plan I believe for all concerned would be to make those who handle silver interested in saving by giving them a percentage of all they save. The man who has been in business for himself and practised this kind of economy requires no inducements, as it has become to him a duty which forms a part of his daily practice.

The methods for saving silver vary with different operators, each adopting that which seems best adapted to his situation and the amount of silver used. The necessity for watchfulness and care commences with the first handling of the crystal nitrate, to see that no grains are scattered on the floor, and that clean, dry paper is used in the scales in weighing it out.

In making a bath the bottle should be placed on a broad sheet of paper (an old newspaper will answer) to catch any drops or drippings that might otherwise go on to the floor. One will be surprised to see in a short time how this paper will be stained. It should always be used when the bath is filtered, and the bottles kept on it. In pouring into the filter, or from one vessel to another, care should be taken to catch the last drop, otherwise this last drop runs down the side, and in handling the bottle the hands are sure to be stained. Some may experience difficulty in decanting the solution from a glass bath without waste. If not too large to be handled conveniently, it may be poured from one side with perfect safety by pasting a little strip of albumen paper close to the top of the bath where the solution is to be poured out, or a small cord tied round the bath near the top will serve the same purpose.

In the dark room the shelves should be covered with paper, and especially near the holders, where it is well to keep a sheet of thick blotting-paper. If the holders be fitted with bottles, and plates used the full size of the holders, these may catch the drippings well if care and attention are exercised; but in the hurry of work they are unreliable and much silver is lost. A bottle of the right shape has never yet been used. The only one ever made for the purpose is the traditional one with a hole in one end, which is always more ready to let the solution slop out than to let it go in. A bottle with the opening in the centre and a slight neck to it would be free from the objections which have consigned the present style to almost entire disuse. But the cleanest way of working is, no doubt, to prevent any dripping from the plate. This is done by draining the plate well as it comes from the bath, and then wiping the back till there is no solution to run, the plate being held on its edge on a sheet of blotting-paper during this operation. The solution drains from the film side, and when the plate is placed in the holder a little strip of blotting-paper under each corner will absorb all further drainage. Instead of wiping the back of the plate, it may save time to have a piece of blotting-paper the size of the plate to place against it immediately it is put in the holder. Keeping the holder in a horizontal position while it is being carried from the dark room to the camera is also a preventive of dripping.

The practice of these methods may, from the recital of them, seem too troublesome to pay, but they are not really so when once they are put in practice and adhered to. They not only save a sufficient amount of silver to pay for the trouble, but they prevent the gallery from assuming the unsightly appearance which is the result of a loose and indiscriminate dripping, and from which the operator himself usually carries, both on his clothes and his person, the indelible evidences of his profession and slovenliness.

The next important point for saving is in the development, and here various methods are used. In the early days of photography, when many of its votaries, doing business in a small way, were obliged to carry their water from a pump in the yard to the third or fourth story, the washings were all collected in a tub, and every day the waste water drawn off, to be carried down as it had been brought up, or emptied out on the roof, to find its way to the ground by the conductors. These tubs formed excellent silver savers, though their real value was hardly then appreciated; and something of the same sort answers the purpose admirably now. Where a large business is done a large tank should, of course, be used, and where there is not room to place it under the developing-tank in the dark room it should be placed in a room below, or in the yard outside, if the climate be not too cold in winter, with a pipe leading to it. Over this tank the negatives are developed, and washed just enough to clear them of the developer and whatever surplus silver may be on the plate. Into this tank all washings of vessels that have contained silver solutions are poured. The developer is usually sufficient to precipitate all the silver, and by a waste pipe attached to the tank the clear water can be drawn off every morning, or when the tank is full, provided it does not fill more than once a day. Where a small business is done a large dish or wooden tray may be used for the developer washings, or a developing tank constructed with separate apartments, one of which shall be used for this purpose. Into such a tank, or a separate dish, all the films from waste plates should be scraped while they are still wet.

The hypo. fixing bath for negatives becomes well charged with silver after a time, and if well cared for will yield a good return. When this bath shows signs of failing—which are usually spots on the negative after fixing, though they are not of such a nature as to show in printing—it should be poured into a large bottle or earthen pot; a wooden tub or butter firkin will do, and as it becomes full add a quantity of a solution of sulphuret of potash, stir well, and let settle. The clean part may then be decanted, and the vessel filled again in the regular order of business.

As this completes the routine in the negative department I will not extend this article, but leave the methods for saving silver and gold in connection with the printing to be discussed in another paper.
—*Phil. Phot.* Robert J. Chute.

ABOUT ACETIC ACID.

A few years since I was troubled with a bad sample of acetic acid, pharmacopœia strength. I did not suspect it until all the usual tests for defective collodion, bath, &c., failed; then I turned my attention to it. I tried less and less until I only used two drops to the ounce of developer; the pictures were beautifully clean, almost like positives, but without any half-tone. I procured a fresh sample and all my troubles ended. I presumed it was contaminated with sulphurous acid, and decided to use the purest I could obtain for the future.

With respect to Mr. Gilfillan's paper: if Mr. Gilfillan would substitute nitric acid, three drops to the ounce of developer, instead of acetic acid, he would obtain the delicate pearly whites of the old glass positives, instead of the unpleasant grey resulting from the use of acetic acid. F. York.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

Beechey's lantern is one which, from its nature, ought to become popular. It is strange how valuable hints and inventions that have been given to the world in a past period have long lain dormant, to be revived once more in these latter days. This suggests the reflection that many inventions come into the world, and numerous suggestions are made, long before the photographic world is in a position to receive them. The Beechey lantern is doubtless one of these, and I think, now that public attention has been directed towards the matter, that the instrument will be taken up and carefully "looked at." Many inventions are introduced at a time when we are not ready to receive them, and this thought suggests some specific applications. For example: what is now known as "poikilography," and for which a patent has been obtained during the year just closed, formed the subject of another patent obtained a long period back; and everyone is aware that the subject of auxiliary exposures was brought before the readers of this Journal several years ago, but a favourable time for its reception only arrived when a modern patent was obtained to bar the way.

Talking of patents: it would be very desirable if some one would take out a patent for the application of an actinometer wherewith to determine the exposure required for a negative. It is quite true that Mr. J. H. S. Ellerbeck brought the subject forward at a meeting of the Liverpool Amateur Photographic Association, and that a great deal of useful information has been placed at the disposal of anyone who chooses to read; but as photographers never seem to jump at any good thing until they are prohibited from using it, or until they are told that if they touch it they do so at their peril, it only requires such interdiction to be applied to the new application of the actinometer in order to bring it into general favour and use. The history of photographic invention and discovery affords numerous instances of the truth of this proposition. Verily, "stolen waters are sweet!"

Now that it has been demonstrated that portraits may be taken at night by the electric light, what have we gained? It has been known for over a score of years that the actinic power of the electric light was such as to enable portraits to be taken by its agency; and other lights, especially those produced by pyrotechnic compounds and magnesium, have long been employed, although very infrequently, for the purpose. Pondering over the description of the means employed by Mr. Vanderweyde for directing his light upon the sitter, I am struck by the apparent inutility of the leading feature in his patent claim, viz., the large and expensive lens which is made use of to converge the rays of light from the reflector upon the sitter. It should be apparent that if a reflector of a suitable form be selected the whole of the light which falls upon it will be condensed upon the sitter without the necessity of employing a Fresnel lens. Looking at the matter from the patent point of view I inquire—if I find that as good or, perhaps, a better picture can be obtained without the use of such a lens than with it, am I not at liberty to use such an arrangement without reference to the existence of the patent for something more elaborate? And, further, may not the magnesium or other powerful lights answer equally as well as the electric? I have seen some effective portraits taken by means of a lump of phosphorus being ignited in the midst of a small hillock of powdered nitrate of potash, still better ones taken when the chlorate of potash was substituted for the nitrate, and best of all when a bit of phosphorous was ignited in a jar of oxygen. Sulphur burnt in oxygen also yields a magnificent flame, which is very rich in the actinic rays. While it is well to know that portraits may be taken by artificial light, it does not seem to me to be a wise direction in which to push photographic portraiture.

The present dull weather suggests the time as being fitting for re-introducing an idea that was begotten of the cheapening of magnesium. In the dull weather we are now experiencing the light is often sufficiently good to enable a dull, flat portrait to be taken without any sparkle in the high lights, or what ought to be so. An excellent remedy, and one which may be easily applied, is to ignite a bit of magnesium riband, and allow the light to fall upon the face of the sitter at a suitable angle during a brief proportion of the time of sitting. This will supply the lacking high lights.

I observe that the South London Photographic Society has decided upon electing honorary members. What the world will look for with interest is a reply to the following question—What qualifications will be necessary ere a person be competent for election as an honorary member of the South London Photographic Society?

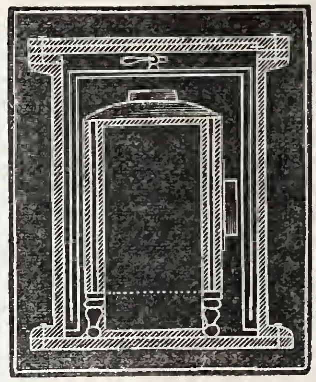
(To be continued.)

HOW TO EMPLOY PHOTOGRAPHY AND THE LANTERN AS EDUCATIONAL AIDS.

It is some years since I put pen to paper in connection with my old hobby-horse, the magic lantern, in its association with photography; nevertheless, I have not been idle in the interim, and I now wish to impart to my former readers, through the pages of The British Journal of Photography, some of my experiences.

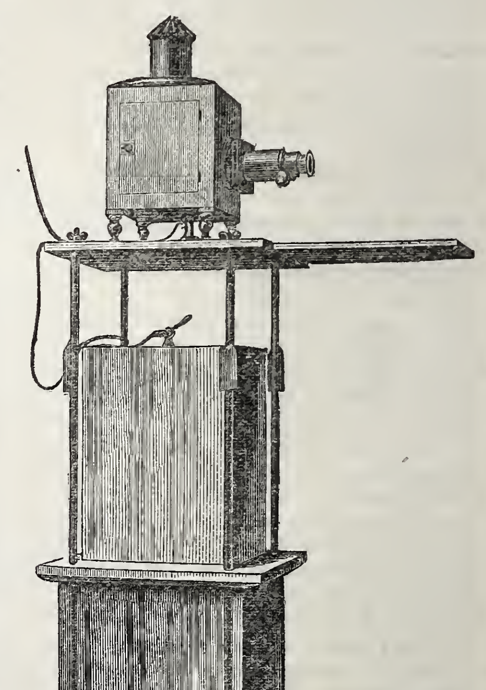
In 1856 I first employed the lantern in association with photography for illustrating the course of lectures on *Microscopes and Aquaria* I gave at my private laboratory, and since that time the educational value of this association of process and instrument has been ever present in my mind.

FIG. 1.



At the International Exhibition of 1862 I contributed some of my first educational slides, and exhibited my first attempt at making the lantern and its appliances portable. This was the arrangement shown in *fig.* 1, where the instrument packed inside a square gasometer, and when "rigged up" the gasometer formed a stand to the lantern, as shown in *fig.* 2, whilst *fig.* 3 shows my first arrangement of the bi-unial lantern. These first ideas are of interest as landmarks whereby to indicate the amount of progress made towards perfection since 1862 to the present time, when I come to describe my final arrangement of portable lanterns for travelling lecturers.

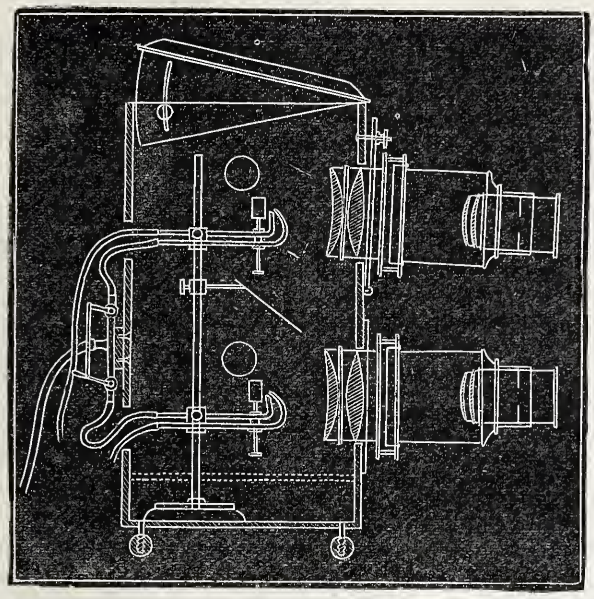
FIG. 2.



My first slide frame is shown in *fig.* 4, of which there were a pair, for interchange, one slide in and one slide out, and these in connection with grooved boxes, as my primitive arrangement for economising space for these slides and their orderly arrangement ready to the hand of the lecturer, forms another landmark, from which progress must be recorded.

My first portable screen was in the form of a wall map case, but I shall have much to say on this important item in the lecturer's outfit. Portability, with arrangements provided for quickly fitting up and removing the lecturer's outfit means economy in carriage, in assistants, and in time. The arrangement of the jet has also undergone an important change since 1862, with the object of placing the lecturer in the desirable position of being provided for any emergency in which circumstances may place him, as well as for obtaining the greatest amount of light, and that with perfect safety.

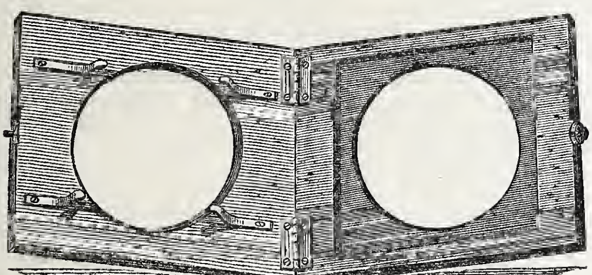
FIG. 3.



Gas-generating apparatus and gas reservoirs have also claimed my attention in the aim at making the lantern a perfect instrument for the use of the teacher.

As I have been totally unconnected with business for the last four years I contribute these articles *con amore* with the view of adding to the general store of information on this subject, and

FIG. 4.



there will be many details given which I have never yet published. Another section of my papers will be upon the production of the slide, more especially where it has to be prepared for colouring; for every lantern worker knows that if landscapes including foliage are taken from nature by photographic agency it is impossible to convert the dark deposits into brilliant green by the most skilful colouring. So where for natural history, historical, or other purposes colour is a *sine quâ non*, then we must bring the draughtsman to our aid, and he has a lesson to learn as to how he can best apply his art so as to play into the hands of the photographer and colourer and assist their efforts in their several departments. This is a department I have made a special study, in which I trained my eldest son. As we have had some varied experiences in carrying out the magnificent historical series ordered by the Russian government, the Gilchrist Trust geological series employed by Dr. Carpenter in the Royal Society and British Museum lectures, and Ernst Griset's comic series ordered by the Nabob of Bengal, I trust I shall be able to give my readers some hints on matters I have hitherto treated as trade secrets.

The production of what are known as "effects" for the dissolving-view lantern have not, so far as I am aware, ever yet been treated of in relation to the means of photographic production, and on this subject I shall have some hints to offer.

Samuel Highley, C.E., F.G.S., &c.

MY DISCOVERY.

From my youth upwards I had been of an inquiring disposition, and when late in life I took to photography the problem of how to photograph in colours absorbed my principal attention. Days and nights of hard study had some time since deprived my head of its natural adornment, and for my good looks in this particular I must confess indebtedness to the *perruquier*. But pray, intelligent reader, do not run away with the idea that I was vain by any means. A youthful appearance was of considerable importance to me from a business point of view, especially with the unmarried portion of the opposite sex. The little time I could devote from the money-getting portion of my labours was devoted to experiments with the end in view to which I have already alluded, but, I am bound to confess, without any direct success. However, a look on the focussing-screen at the marvellously-beautiful and evanescent images thereon depicted sufficed to make me return with fresh vigour to my study and experiments.

It had been a terribly wet season. Rain, rain, day after day and week after week, continued, and on this, the day of my discovery, it was, if anything, worse than its predecessors, varied by heavy thunder and lightning. I was sitting down in my glass room, watching the hail as it viciously pounded the skylight, expecting instant damage, and that my last new idea of glass-room construction would be carried by assault and battery, when my thoughts ran into their old groove of colour photography. "No fear of interruptions today; much too bad for sitters," I thought. "One more trial, and if I don't succeed; well, try again—perseverance overcomes," and all the rest of it. So I lit a spirit lamp in my laboratory, over which I suspended a glass flask containing an elaborate mixture of chlorides and bromides, with due precautions as to the degrees of heat, and was just on the point of testing a solution out of which I had great hopes something good would come, when, to my surprise, the studio bell rang a vigorous peal, and my assistant ushered a gentleman into the room. I say "a gentleman;" but what with wraps and waterproof it was rather difficult to be assured. After some time spent in disrobing and apostrophising the weather, he stood before me—a little man with the most unpleasant expression of countenance I ever recollected seeing. I had flattered myself on being a shrewd physiognomist, but I had to own myself baffled this time. His address was not much more prepossessing than his appearance. "Take my portrait full length, and let it be good or I shan't pay," were the first words he spoke to me, or rather snarled. Now it was much too dark to take any portrait, good, bad, or indifferent, so I politely told him portraiture was entirely out of the question—there was absolutely no light, &c., &c. "No light!" he snapped out. "You arn't burning the gas yet, and you can see me. What do you mean? Isn't there Godellari's method with coloured media? Then there is pre-lighting and after-lighting, and continuating action; there is Misonas's method, and there is the nitro-sulphur light, the oxyhydrogen light, the pyro-hydrogen light, the magnesium light, and the deuce knows what lights besides! Yet you pretend you cannot take my portrait because there is not enough light, and, besides, there is *my* method, by the side of which the rest are absolute failures!" Then he paused and looked at me.

"Really I am at a loss, not having the advantage of knowing your name," I ventured to remark. "Never mind my name," he replied, "I know yours. Moreover," he continued, patting the side of his nose with his forefinger, "you would like to know how I do it, wouldn't you?" Thinking I had possibly some eccentric character to deal with from whom I might pick up some crumbs of information, I said I should much like to know, if he would kindly describe his method. "Very well; yes. Put in a plate for two pictures, and scratch it with a diamond so that we can divide it after exposure and before development; then I'll show you."

I did as directed. "Now take my portrait and expose as if it were the best light imaginable. How long should you give it, eh?" "Till tomorrow morning," I replied. "And then, if the light didn't improve till dinner time, then wipe it off, and put another plate in." "That's what you think, eh? Well, do as I tell you. No head-rest!—No, no! I can sit half a second quite still, and that will be full exposure, in my opinion. You photographers will over-expose your negatives so much! I never see any of your new-fangled dry plates that are not spoilt from over-exposure. Even in the shadows—over-exposure! Want of detail—over-exposure! Harsh contrasts—over-exposure. In fact, not one in a thousand of you know how to expose. Now, then, I'm ready."

I removed the cap for the half-second directed, smiling to myself at the absurdity of the thing, and we went into the laboratory. "Develope one half *your* fashion." So I developed, or tried to do so, but, as I expected, not a vestige of an image made its appearance. "Now," he said, "do it *my* way. Bring a saucer here and put into it a teaspoonful of spirit." I obeyed. He then pulled out a small bottle of some dark liquid from his pocket, carefully added a few drops to the spirit, and directed me to light it and expose the other half of the negative to the flame at a few inches distance. The flame thus made was of a very singular character.

It was not a monochromatic flame, nor yet like that of burning alcohol; but consisted of every imaginary colour, each colour predominating for an instant, then giving place to its complementary colour of the most intense and beautiful description, This continued until the alcohol had burned itself out. "Now," he said, "I will add a drop of this to your ordinary developer, then proceed to develope as you usually do." To my intense surprise out came an image, which gradually obtained printing density, and was not only a good negative, but one of the best I ever remember taking. Noticing the effect produced by me, which was one of astonishment and delight, he asked—"Should you like to know how it's done?" "Oh! very much indeed!" I enthusiastically exclaimed. "Will you tell me the secret?" "It's no secret; the simplest thing imaginable. An old process and old materials used with the knowledge of experience—nothing more. Tell you? yes! This solution is composed of—but stay. I have the formula and particular directions for mixing in my note-book. You shall copy them; but, by-the-bye, you, too, have interesting matter to communicate with regard to colour photography. I take quite an interest in the matter myself, having done some tolerably successful things, and will show you them when we go out of these vapours."

Taking a small leather case from his pocket he selected some dozen pictures from it, and handed them to me. Could I believe my eyes? Here were the very transcripts of nature in all the glory of colour and detail. Sunset views, with all the brilliant and gorgeous colours of the western sky. Early morning, with all its pearly greys and atmospheric effect. The brunette and the blonde—each and every one in its own true and varied tints, and no heaviness or artificial appearance—nature and business itself. At what marvels of science and consummate skill was I looking? and who was this skilful operator? All *my* years of study and sleepless nights had helped *me* to nothing like this—the very ultimatum of all my wishes; and here was a stranger showing me such triumphs merely as small successes!

I was positively in raptures—too affected to speak at first. When I could find words I said—"Will you teach me to do this?" "Yes, I will," he replied, "for a consideration. I'm a poor man, and money is an object." "Name your price!" I almost shouted. "I will give anything, everything, to be able to do it." "Good!" he said, and placed in my hands a sealed paper. "If when you have read this you still desire the knowledge and continue still of the same mind—well; but, mark me! you will have to make great sacrifices." He laid his hand impressively on my arm and said—"Tomorrow, not now, I will call for your decision. Now help me on with my wraps."

I was not long in opening the paper, but the contents were so extraordinary, and such a systematic jumble of science, theory, and speculation that for the life of me I could not make it out. I read, for the writing was lawyer-like and distinct, and couched in the most seemingly explicit and clear manner for a few pages, when a sentence would occur that had the peculiar effect of confusing all that had seemed so clear to me before. All that night I sat up, and the greater part of the next day, with a wet towel bound round my temples, worrying at this puzzle, and was hard at it when my visitor returned.

"Ah!" he exclaimed, as soon as he entered, "it is useless trying to understand that without the key I omitted to give you." At the same time he placed a diminutive box on the table, from which he took several bottles and a small glass flask. "I have a plate here that has undergone a preliminary preparation, and will, to prove my good faith, obtain a photograph upon it in natural colours of any object you may desire." There was a pretty view from my window, and I pointed to it. He adjusted the camera and rapidly exposed the plate. On entering the laboratory, to which I accompanied him, the first process was to expose the plate to certain vapours in a closed box, wash with spirit, and expose again several times to other and different vapours, with the intermediate wash of spirit.

"Now, observe!" he exclaimed, as he superposed a piece of prepared paper upon the film, "all you have to do is to strip it off—like this," and, suiting the action to the word, he placed in my hands as perfect and beautiful a *facsimile* of the view from my window as I had ever seen on the focussing-glass, and the time occupied did certainly not exceed twenty minutes. "Now I think I have satisfied any doubts of my ability that you may have entertained. Oblige me by fetching that flask from the table in the adjoining room and I will show you something more; but, for heaven's sake! be cautious and don't remove the stopper."

I went on the errand in a nervous state of excitement, and had just raised the flask from the table when, horror! it slipped from my fingers. Crash! the room was instantly filled with dense vapour. Part of the contents were projected over me and trickling down my face and neck, and, with a disappointed cry, I started up to find the skylight broken and the rain soaking me in a copious stream from the aperture. This was "my discovery," and, to make certainty more certain—"How much longer do you mean to keep supper waiting?" came echoing up the stairs. I had only been asleep after all, and am as far off the wonderful discovery as ever. Oh! dear! E. D.

COLLODION EMULSION AND OTHER MATTERS.

Those who do not care to prepare their own will find the "Liverpool" emulsion quite up to the mark. I do not always use it, but keep it for a photographic treat, as I find it easy to work and very satisfactory. I expose pretty long with it, and develope with an eight-grain solution of pyro, adding to it, twice, six to ten drops of bromide (ten-grain solution) and the same quantity of dilute ammonia (one to eight). I simply mention this because I find it much better than adding the bromide and ammonia drop by drop, as has been recommended by some. The predevelopment organifier gives an extraordinary density to these films—far too much, in fact. I find, however, that adding a small quantity of tincture of quinine to the alcohol, for moistening the plates, gives a very fine colour and generally improves the negatives.

Emulsion plates show an uncomfortable inclination to obliterate the distance, from over-exposure. I often give the foreground three minutes and the distance twenty to thirty seconds. The best way to do this is to cut a piece of card of the requisite size, "dentillate" the edge like a postage stamp, only much larger, and place it before the lens as close as possible. You will now see on the ground glass that only part of the picture is there, and also that the line of junction between it and the dark part of the glass is invisible. I am indebted to Mr. W. B. Woodbury's kindness for this, as also for putting me in the way of working successfully the emulsion process.

I have always worked with a very deep orange light in the dark room, often using a ruby-red glass in the window. I have sometimes wondered how anybody could manage with the almost white quality of light they have used.

Once I went into the room of a professional photographer and saw white light coming through chinks between the boards, enabling the operator to have dispensed almost altogether with the yellow window! He complained of the bath or something else being out of order; but, considering that professional photographers should know far better than amateurs, I wisely said nothing. This was at Sorrento, where I passed some time last summer. Seeing the beautiful "bits" that there were on the mountains and by the sea, I asked one man there why he did not photograph them, and got for answer that they were only good for painters to take; and this sentiment seemed to pervade nearly all the photographers here. Fortunately Americans and English consider just those little "bits" eminently adapted for the camera, and so take them.

The photographer must acquire something of the art of the artist if he wish to excel. We want a little more than simple manipulatory skill; we must cultivate artistic taste if we wish to turn out proper work.

There are a great number and variety of pretty views round Naples; but in the shops there is nothing but the commonplace "tourist-sights" that *must* be taken, and nothing more. They are sold at about five shillings the dozen, whole-plate size. Of course at such a price nothing can be done; but I fancy it is the photographer's own fault, for the public generally pay well for first-class work. There are photographs of the last carnival in several of the stores, but they are all most admirable examples of "diffusion of focus," and shadows as black as *Erebus!*

I have not seen more than two or three formulæ published for preparing sensitised paper that will keep, and these are hardly practicable. I found rather a good one in Monckhoven's book. It is this:—

Nitrate of silver	12	parts.
Nitrate of magnesia	12	,,
Water	100	,,

For amateurs especially it is now almost indispensable to have paper that keeps well.

One day, when out with the camera, I was exposing a plate, and had sat down to count the seconds required, when, looking up, I saw a man intently watching me. He was a common field-labourer, and such a thing as a photographic apparatus with a glittering eye he had doubtless never before seen, and the fact of my lips moving clearly proved to him that there was some magic connected with it all! After exposure I let him look at the picture on the ground glass, but it required some time for his curiosity to overcome his superstitious awe. Even yet, in this country, among the peasants anything strange is put down to miracle; but the national intellect is emancipating itself in science, as in other matters, from the tyranny of superstition and ignorance.

I should like to write more about the beauties of the country around, but it would be misplaced here. Let me say with my illustrious namesake, Samuel Rogers :—

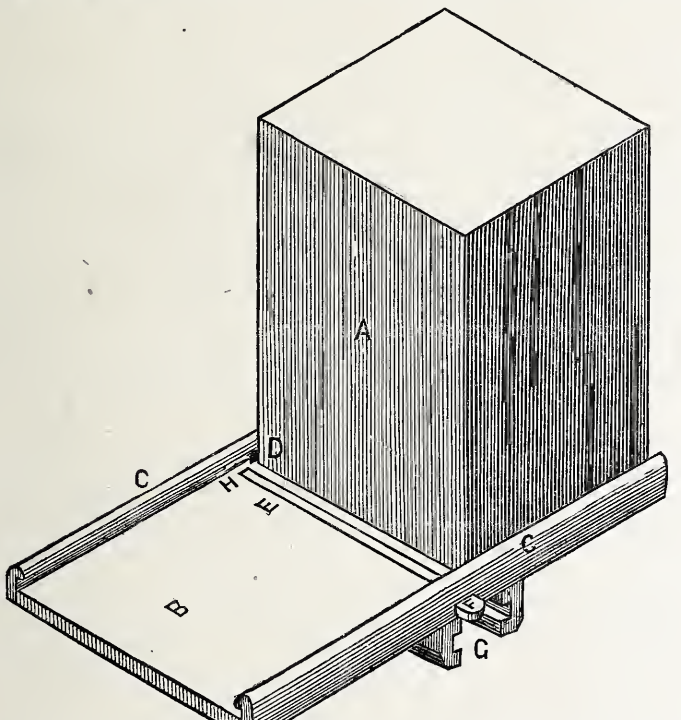
> "This region surely is not of earth.
> Was it not dropt from heaven? Not a grove—
> Citron or pine or cedar—not a grot,
> Sea-worn and mantled with the gladding vine,
> But breathes enchantment."—*Poem on Italy—Naples.*

Naples. HENRY G. ROGERS.

DRY-PLATE BOX.

HERE is a sketch (quarter full size) of a dry-plate box, to be used with the ordinary dark slide of a half-plate square camera), which I made about four years ago and found to answer admirably.

First: the Dry-Plate Box.—Take the dark slide and mortice a hole into the side to admit of a half-plate endways without scratching, and fit a sliding cover into the same, light-tight. Now refer to the following diagram, in which A represents a box fitted with grooves to hold fifteen



half-plates, open under and sliding to and fro on the base B, of which C C are the sides, grooved to allow a piece of brass to slide each side, which, being fastened to the box, keeps its mouth close to the base. Notch the piece at D to catch with the spring H, as each plate stands over the opening E, which is opened by drawing out F. Fix two cheeks across the bottom of the base, grooved to admit of two slips which are fixed on each side of the dark slide. Finally, make a plate-carrier with three sides only, two of which must be rebated to allow the plate to slide. Reverse the spring in the door, and fix a piece of brass to it, passing it through the door so that the spring may be drawn forth from the outside; put an india-rubber washer round the same between the spring and the door, fastening it to each to keep out the light. Work it in the following manner:—Fill the box with prepared plates, and slide it on the base as shown in the diagram; when required shift it forward until the first plate is over the opening E, which you will know by the click of the spring (remember when once pushed over the spring you cannot get it back without going into the dark room). Next slide the dark slide between the cheeks G, draw out the shutter in the side of the dark slide, also the shutter F in the base of the box, and the plate will commence its fall, which it will complete on your drawing forth the spring of the door. Close the little shutters, draw out the dark slide, expose the plate and return to the box the same way, and move forth for the next. The above box is easily made, and if made nicely will answer well without injuring the dark slide.

JAMES HARRIS.

ON POSING.

MANY photographers recommend their sitters to smile, to keep themselves steady, and to look at some fixed point. This is the reason why we see so great a number of portraits wherein the expression is ugly and false, and which show for the most part but forced contractions of the facial muscles, producing an unhappy grimace. In others it is an awkward stiffness which replaces gravity, or where the expression of the eyes should be fine and spiritual it is vague, trembling, pitiful, and paltry. The air of good nature and kindness is replaced by stupidity. All these defects come from the artist not having mastered his model sufficiently, or that he fails in the necessary talent to produce a complete and successful work.

There is an equally important point—that is, the truthfulness of the photographic image. Dimension, or rather proportion, ought to be given to the portrait. It is easy to understand that a large and strong person should occupy in the frame traced out in advance a place more considerable than one who is smaller and more delicate. It would give a false idea of a child ten years of age, for example, if in a full-length portrait he was made to fill the same place as a stout man of six feet. The one would have the air of a giant, and the other of a little man or a dwarf, which would certainly not give a just idea of either of these individuals.

The corpulence and size of the subject ought to serve as guide, and it would not be suitable to give the same proportion and size to the portrait of a great and illustrious person as to that of a child playing. In the two cases the picture ought to be treated differently, and the backgrounds, as well as the furniture and accessories, ought to be in harmony with the character of each of the subjects. For full-length portraits the personage will appear so much taller and slighter by leaving less space or air and background above the head; the relative position of the image on the picture has therefore a great importance as to the real proportions of the sitter. A. LIEBERT.

Paris.

HIGHER EDUCATION OF PHOTOGRAPHERS.

IT is a mere truism to say that real practical life-education commences where school education ends, and it is then that those intended for what are called the learned professions commence the studies required to fit them for their practice. As a rule the *curriculum* is extensive enough for any one mind to do full justice to it, and yet I venture to say that not one of those professions demand an acquaintance with so many different branches of knowledge as does the proper and intelligent practice of photography.

How this knowledge is to be acquired is a question of considerable importance. In most of our large towns the necessary machinery already exists, but in a form hardly suitable to the requirements of the apprentice or assistant photographer. Under the present circumstances it is true that here and there we find one who, in virtue of his thirst for knowledge, has overcome difficulties and obstacles, and climbed the ladder of learning to a height far above his fellows; but such cannot in the nature of things become general till more suitable provision has been made for the kind of teaching required. What that ought to be is not difficult to understand. What is wanted is not a perfect, or even extensive, knowledge of the various branches of science and art, but a thorough acquaintance with just so much of them as is involved in the operations in which they are engaged, and applied in the apparatus which they employ.

Neither do I see much difficulty in organising the machinery necessary for the purpose. In most of the larger towns in the kingdom—in fact, wherever there is a photographic society—the matter could be faced and successfully carried out by a few of the more energetic members. One of themselves, or, if need be, an outsider apt to teach, could surely be found willing to undertake the necessary study to qualify himself for the office of teacher. A suitably-equipped lecture-room might fairly be made a charge on the funds of the society, or defrayed by a small subscription; and a little personal dealing with those for whose benefit the college had been instituted would result in the formation of a class that ought to include everyone anxious to succeed in his profession.

The love of learning and a desire to rise high in the profession ought to be sufficient stimulus to bring the students out; but in this utilitarian age the *cui bono* cry will doubtless be heard. It is, however, easily answered. Masters who undertake to teach the mysteries of the craft to apprentices, and expect during the latter years to be repaid for the early trouble of such teaching, would find it to their interest to pay the fees, as the pupils would sooner become valuable assistants, while they would be saved from much drudgery in teaching; and assistants would soon find that the man who knows most and can best apply that knowledge will always command the highest salary. Then, although the fees should of necessity be low, they would in the aggregate amount to a sum sufficient to pay the lecturer well, as the lectures, taking place at night, need not interfere with his ordinary avocations; while, if he should possess the knack of making the lectures and demonstrations sufficiently brilliant and attractive, the class might be largely increased by the attendance of amateurs and outsiders.

JOHN NICOL, Ph.D.

Correspondence.

DOUBLE-COATED PIGMENT TISSUE.

To the Editors.

Gentlemen,—I am pleased to see by the article by Mr. H. Cooper, in the Journal of November 30th, that the above subject is again occupying his attention, and that its merits are again advocated after lying dormant for so long a time.

You will remember that in March, 1871, I sent a communication to the Journal, and that an article of mine also appeared in the Almanac for 1873, in which I broached the idea, quite unconscious, till I read Mr. Cooper's letter, that he had before that date proposed the same improvement. The obstacle at that time to obtaining tissue so prepared was that the company holding the monopoly of the carbon processes did not seem to see their way to making the suggestions I gave them available in a mercantile sense.

The feasibility of preparing such tissues was demonstrated by me at that time, and the fact of the improvement lying so many years dormant is a convincing proof of the obstructiveness of a company holding such comprehensive patent rights. It seems clear that, so long as they can make money by their ordinary routine system, they have no inducement to enter upon a new field of work. The evil is want of competition. The patent holders *will not*, and the other makers *cannot*, advance; but it is most injurious to the interests of pigment printing, and indeed to general progress, that such a dog-in-the-manger policy should be upheld.

Mr. Johnson's process is ingenious, and looks like an improvement so far as it goes; but I think a two-tint tissue would be better. I suppose Mr. Johnson's patent is, or will be, absorbed by the same comprehensive concern; if so, it may fail to be a blessing to the profession or the public.—I am, yours, &c., G. S. Penny.

Cheltenham, December 29, 1877.

ART PORTRAITS.

To the Editors.

Gentlemen,—When I was honoured by the request to write a short paper for the Almanac I stated my inability to do so for reasons satisfactory to myself. I hold that "deeds are better than words," and I now intend giving you a tangible proof of my goodwill towards all men in general and yourselves in particular.

It has been suggested by friends and others—amongst whom are metropolitan artists of repute—that I ought to publish a series of cabinet portraits which to them seemed worthy of notice, and might prove useful to others. Had I no other object in view than that of parading before you what I can do, and otherwise expect benefit from your goodwill, I would refrain; but I hope you will credit me with better motives, and it will be for you to determine to what extent I justify them.

From publications sent to me I find that our American friends complacently "lay the flatt'ring unction to their souls" that they do everything photographic very much better than we do; and it is this "idea" that has suggested to me a few remarks which I intend making for the good of all whom it may concern.

There are three points to which I wish to draw attention in the cabinets I have sent you:—1. That pictures should not be made of backgrounds. 2. That retouching should be an aid only. 3. That expression is an all-important object in portraiture.

In the first place, do not imagine that I object to a suitable background as a valuable property for the studio. What I wish to point out is that it should be what its name indicates, and appear quite subserviently to the subject. I object to the pawnbroker's-shop appearance when the furniture is piled on. I want the subject first, the surroundings next, and finally the background behind. "Distance lends enchantment to the view" is a good motto for photographic backgrounds, and when in use should be placed at from one to one and a-half yard from the subject, as circumstances require.

Secondly. That retouching should be an aid only, and particularly confided to hands skilled in the art of drawing, and even painting, is a fact which forces itself more and more upon the artist-photographer's attention every day. But, I would ask, how many retouchers are there who have ever held a pencil or a brush? Very few indeed, I should say, if we are to judge from what we see every day as we go along. Look at all the portraits of celebrities, and note particularly those of a certain "Diva," who is made to appear as being always "sweet seventeen." What a pity it is to behold otherwise excellent productions of our transatlantic friends so completely done to death by the pencil, and to find that all real beauty, character, and even resemblance have been "licked entirely out of creation!" Away, I say, with these French polishers, photographic planers, smoothers, and levellers of all things to be respected! I protest against this wholesale "massacre of the innocents," because it is not artistic, and there is too little of truth left in it to be acceptable. Flattery may go a certain length, but it becomes the "food of fools" if carried too far; and, as our witty neighbours say—*s'il en faute, pas trop n'en faute.*

My third point—that expression is all-important in a portrait—is so patent to everyone that it may appear superfluous to insist upon it, were it not that we so seldom see that "revelation of the soul," so to speak, depicted on the countenances we study as they appear "photographically." To arrive at the best results many little things should be observed; for instance, rapid arrangement, avoiding all causes of annoyance or fatigue to the sitter, such as entrenching with furniture and the aggravation of trying many attitudes to arrive at effect. Simplicity both for effect and attitude always produces the best results. It may be objected that in our climate it is often very difficult both on the part of the sitter to "retain," and that of the photographer to "catch," a good expression, because the time of exposure is generally too long. That is quite true, but the evil suggests the remedy: study this point!

In conclusion: I will now ask you whether the evidence I have laid before you bears out all that I have said? If I have failed to satisfy you that pictures can be made without backgrounds, that faces can retain their character, cheeks be fleshy without coarseness, and honest wrinkles respected without harshness, and, finally, if I have failed in securing happy or appropriate expressions, allow me to say, in the words of the great poet, "Lay on, Macduff!" But I will not "damn" you, neither will I cry "enough!" Should the expectations have been realised I shall not object to your singing a hymn of praise in the sweetest tones. You know that we are very vain—we knights of the camera. In fact, some of us even go the length of saying, which is very much worse than *thinking*, that they alone can photograph—evidently an "optical delusion." Some might even hint at something loose in such cases. On the other side of the pond they call it "high flying." The true definition, I think, is "brag;" but, as this is the time of peace, let us say that it is simply a "weakness!" And yet I don't altogether dislike those brothers who may have too long inhaled the intoxicating perfume of the collodion bottle; they are generally clever fellows, and should content themselves with being "cocks" among their peers. I have a much greater dislike to those *theorists* who flood photographic literature with their visions of what would be very delightful if we could only discern one grain of sound practice as a basis for their lucubrations. I am of the same way of thinking, on that subject, as a great man who has truly said that a little common-sense is worth all the learning in the world. As a last word, I would say to our theorctical friends that, so long as they have not fully tested their theories by abundant practice and satisfactory results, they ought not to allow themselves to be troubled with the *cacoethes scribendi*, of which they may have read, and should desist.—I am, yours, &c.,

Liverpool, December 29, 1877. C. Ferranti.

[Until we read the foregoing we were unaware that our American friends imagined "that they do everything photographic much better than we do." It is quite true that there are some photographic art-giants in America—to wit, Gutekunst and men like him—but they have ever been exceedingly reticent in speaking of their own works. The three points—namely, backgrounds, retouching, and expression—which form the theme of Mr. Ferranti's communication will necessarily commend themselves to every photographer acquainted with, or who has any appreciation of, art or even fidelity to nature. We must confess our inability to discover what is meant by "those theorists who flood photographic literature with their visions of what would be very delightful," &c., &c., to whom he confesses to have a "dislike." Is Mr. Ferranti alive only to practice, ignoring principles? On the subject of the cabinet portraits which accompanied this communication, we are entirely of the opinion of the artist's friends, viz., that he should publish them. We shall by-and-by give a detailed notice of these pictures.—Eds.]

FOG IN THE STUDIO.

To the Editors.

Gentlemen,—Will you kindly allow me a small space in your columns to give expression to a perplexity which must be felt at this season by nearly all photographers—I mean fog in the studio. How can it be quickly and easily expelled?

I remember that Mr. G. Watmough Webster, in one of his very practical articles, once called attention to it, and recommended a short-focussed lens for winter work; but even this is not sufficient. We get such an amount of fog between lens and sitter that anything like a brilliant negative is out of the question. Can Mr. Webster, or anyone else amongst your readers, suggest anything further?

I am sure that this is a subject of interest to all professional photographers, and hence I trust you will allow me to give expression to this in your columns.—I am, yours, &c., Pylos.

Northampton, January 1, 1878.

THE LAW RESPECTING STILLS IN PHOTOGRAPHY.

To the Editors.

Gentlemen,—Is a person using a still in photography bound to take out an excise license? This is a question of some importance to all who are interested in the art of photography. After much inquiry, the conclusion I have arrived at may be shortly stated as follows:—While manufacturing photographers are bound to take out such a license, amateur and operating photographers are not so bound.

Until August, 1846, persons not being licensed distillers, rectifiers, or compounders of spirits, or vinegar-makers, were not required in England to take out a license to use a still; but previously to that year a license duty of ten shillings was imposed upon every such person in Scotland or Ireland not being a distiller. In 1846 a statute was enacted imposing one uniform duty for the United Kingdom. Thus England was placed on the same footing as Scotland and Ireland. No doubt the legislature looked after the two latter component parts of the United Kingdom at an earlier date than it did England in consequence of the enormous amount of illicit distillation of whisky which once existed. There was another act passed in 1861 which gave power to any officer of excise to enter at reasonable times the premises of such persons "taking out a license, or who shall use or keep any still or retort."

The amateur photographer who exercises his art simply for his own pleasure cannot be said to be occupied in the business of photography, and therefore, in my estimation, as the acts referred to do not apply to him, there seems no objection to his keeping a small still for water.—I am, yours, &c., ARGUS.

Strand, London, January 1, 1878.

JOHNSON'S NEW CARBON PATENT.

To the EDITORS.

GENTLEMEN,—In your issue of the 9th of November appeared a specification describing Mr. J. R. Johnson's new improvements in carbon printing. I read it carefully over at the time, and fancied I was not entirely unacquainted with some of the processes therein contained. Being busy I left the matter just then; but, having put on the cap of cogitation during Christmas leisure, it struck me that perhaps the Autotype Company, finding their ground of monopoly slipping away from them by the efflux of time (their tissue-making patent expires in February), had concocted this new patent with a view to somewhat reinstating their position.

I am not going to argue for or against the patents of the company. It may be that no person could have been found to provide the capital and spend so much money as has undoubtedly been spent upon carbon printing unless with some sort of protection. However, that is neither here nor there; Swan's patent being on the point of lapsing it behoves all photographers to see that they are not further burthened without very good reason.

At present I shall pass over Chapter I. of Mr. Johnson's specification, which I confess is beyond my powers, and pass on to Chapter II., which opens as follows:—

"Chapter II.—My first and chief improvement under this head of my invention consists of a new method of obtaining reversed negatives, without which, as is well known, prints produced by the single transfer process of pigment printing are themselves reversed, as when an object is viewed in a mirror or looking-glass," &c.

[Here follows the remainder of the chapter, which we cannot reprint, but must refer the reader to the Journal of November 9, 1877, page 533, in which it is contained.—EDS.]

And now, gentlemen, we will turn to the columns of your Journal of June 1st, 1864, and there will be found the following communication from Mr. Wenderoth:—

"The process, I think, is now complete, and is as follows:—First.—The preparation of the gelatine sheet. Dissolve gelatine or isinglass (gum arabic produces plates more pure even than glass itself, and I would decidedly prefer it if it were not so easily attacked by water, as well as being insufficiently tenacious) at a low heat in water, and do not make it too thin. When dissolved, strain and add to each ounce of this solution *ten drops* of glycerine; mix well and keep warm, or warm again when you want to use it. In my first communication I recommended the use of honey, but I found that it made the gelatine ferment, whereas the glycerine keeps it sweet and makes it more pliable too. Then take a plate of glass of the desired size, wash, dry it, rub over one side a solution of white beeswax in sulphuric ether, and then coat it with plain collodion. When this is dry pour the gelatine solution on, and lay it quickly down on a *perfectly horizontal plane*. To become perfectly dry will take from twelve to twenty-four hours. When dry, cut loose around the edges, take it carefully off the glass, and put it away between sheets of paper in *a dry place* to keep for future use. These plates might be made advantageously as a distinct branch of industry, and kept for sale in photographic material depôts.

"Secondly.—Take the negative in the common way on any kind of glass, but do not omit to rub over the side destined to receive the collodion some of the wax solution in sulphuric ether. To apply the gelatine sheet the negative may be dry or still damp.

"Thirdly.—Immerse the gelatine sheet for one or two minutes in a bath of three parts of alcohol and one part of common water; but be careful to notice which is the collodionised side, as that side should be kept uppermost during the immersion of the sheet. Take some of the alcohol and water bath and pour it over the collodion of the negative, and drain without leaving too much on it; then lay it down horizontally, and put down on the negative the gelatine film with *collodion side uppermost*, commencing at one end, lowering it by degrees carefully, so that no air gets underneath, when it will be found to attach itself very closely and without blisters, which are obviated by the immersion in the alcohol bath, in which the sheet expands, the small quantity of water dissolving just enough of the gelatine to make it adhere to the collodion without softening the sheet too much. To dry will take about one hour; but care should be taken not to cut it off before the plate is perfectly dry.

"By careful attention to these instructions no failure is possible. With this I send you a few samples.

"Besides the convenience of being able to put away such negatives in portfolios, they have the advantage of being printable from both sides, and to be used for composition printing; in which case parts of negatives can be cut out with a sharp knife or a pair of scissors, and joined with others by being carefully in a few very small places fastened down with a little gum on to a plate of glass."

["Mr. Wenderoth will perceive by the report of the North London Photographic Association meeting, page 189, that we recognised the fact of his independent discovery of the process, and we may here add that the clever adoption of the film of beeswax is as original as it is ingenious and effective. We consider this process for the removal of negative films invaluable to all, and especially so in connection with the practical application of Mr. Swan's carbon process.—ED."]

I think any person who carefully studies these two extracts must see that to all intents and purposes the two processes are absolutely identical, and that Mr. Johnson's claims in this direction are worthless. It is well known that if any portion of a patent can be upset the whole of it goes, and, if so, any comment on the value of this particular patent is superfluous.

Mr. Wenderoth's invention was published in 1864, the year of Swan's patent, and was exactly the thing to render Swan's patent of great value by enabling prints to be obtained by the single transfer process instead of the troublesome and disagreeable method of double transfer with india-rubber-coated paper; but, somehow, like many other useful inventions, its value was unheeded and it dropped out of sight.

In 1869 Mr. Johnson brought out his method of double transfer, and his interest in the reversal of negatives would very naturally subside; but now that the lapse of the tissue-making patent is close at hand, and carbon printing by single transfer will be free and open to anybody who likes to take it up, it will not do to have so useful a method of producing negatives suitable for single transfer work fettered by unfounded pretensions. Mr. J. R. Johnson—at anyrate in his "first and chief improvement"—can have no claim to priority of invention.

I must apologise for trespassing at such length upon your space, but believe the importance of the subject will be considered a sufficient excuse.—I am, yours, &c., W. S. MILLER.

Great Yarmouth, January 1, 1878.

PHOTOGRAPHY IN COURT.—At the City of London Court, on Monday last, the case of Wright *v.* Müler was heard before Mr. Commissioner Kerr. The plaintiff, a picture framer, carrying on business in the City, sued the defendant, a photographer, of Kingsland, to recover the sum of thirty shillings for mounting a certain number of photographs by the defendant's orders and upon an estimate given. The defendant set up a counter claim of £5 for damage done to the pictures sent to the plaintiff to mount and frame. Before going into the case the learned commissioner asked the plaintiff why he had not sued the defendant under section 1 of the new act, as he (the commissioner) was determined not to allow a plaintiff any costs who would sue under the old act when the new one was framed for the benefit of the plaintiffs and for the convenience of the court and the public; however, the case must go on, but no costs would be allowed to plaintiff, even if he won the case.—The plaintiff said the orders were given by the defendant and were executed in accordance with that order, and no notice had been taken of application for payment until the present summons was issued, when he was met by the counter claim in question. The plaintiff had no witnesses to call.—The defendant said he entrusted the proofs now in court to the plaintiff to mount, and when they were returned he had to take other proofs and send them elsewhere to be mounted, as those the plaintiff had done were wrinkled in mounting and discoloured by some preparation or other which had been used, and which he (the defendant) supposed to be lime. He never heard of the plaintiff's application for payment, and if he had done so he should have returned the work on his hands.—His Honour asked to see the two specimens of work, and unhesitatingly said that the plaintiff's work was bad in comparison with that the defendant had got done elsewhere. He could not say from what cause the defect had taken place, but "there it was." He should, therefore, give judgment for the defendant, but without costs, as the defendant had also set up his counter claim under the old act. His Honour hoped in future people would avail themselves of the first section of the new act.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Jan. 7	West Riding of Yorkshire......	Oddfellows' Hall, Bradford.
,, 8	Photo. Society of Great Britain.	5A, Pall Mall East.
,, 9	Glasgow	Religious Institution Rooms.
,, 9	Cheltenham Amateur (Annual)..	Savings' Bank.
,, 10	Manchester....................	Memorial Hall, Albert-square.

EXCHANGE COLUMN.

Wanted, 10 × 8 bellows camera with doublet lens, in exchange for large tent and other things.—Address, C. Mason, Dobwalls, Liskeard, Cornwall.

Wanted to exchange Grubb's patent aplanatic view lense, A°, 2 inches diameter, $8\frac{1}{4}$ focus, for a *good* half-plate portrait.—Address, F. S., Whitley Brow, Melksham.

First-class magic lantern, $3\frac{1}{2}$-inch condensers, will be exchanged for anything useful in photography; a quick-acting *carte* lens preferred. Address, E. J. Holmes, photographer, Cranbrook.

Wanted in exchange, a studio camera and Dallmeyer's 1B lens for any of the following:—52-inch bicycle, Woodward's solar camera, 9-inch condenser, cabinet burnisher, five quires albumen paper. Difference adjusted.—Address, Photographer, 11, Grove-terrace, Victoria Park, London.

ANSWERS TO CORRESPONDENTS.

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

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

⁂ With our next number we shall present the title page and index for the last year's volume as a supplement.

Jas. T. Cowie (Troy, N. Y.)—Yours, with enclosure, received.

G. F.—We should imagine that rain water would be best for your purpose.

Argus.—We refer you to our forthcoming Almanac, in which you will find an article on the subject of collodion transfers.

A. D. N.—Vitrifiable pigments, prepared for ceramic painting, may be obtained in a shop near the Piccadilly end of Regent-street.

Permanency.—You will have observed from an advertisement in last number that the information is now accessible under very easy conditions.

W. B. Fisher.—An ordinary film of iodised collodion may be converted into a *bromised* film by immersing it (after being washed) for about a minute in an aqueous solution of bromine.

A. M. Wood.—The verses possess an even flow; but do you not think their publication would serve to damp the joyous feelings that we desire to see pervade photographers during the "glad new year?"

J. Y. (Manchester).—There is no chance of obtaining the information in the manner you suggest, inasmuch as trade interests are involved. Tannin when mixed with gelatine will prove useful as a basis for experimenting. Why not try the addition of albumen as suggested in these pages some time ago?

Dr. R. H.—In one vessel make a saturated solution of sulphate of copper, and in another a solution (of medium strength) of bromide of potassium. Pour the latter into the former. The resulting mixture is an impure solution of bromide of copper, which will, however, answer the purpose of your experiment in connection with intensification.

Omega inquires—"What is the best way by which to prepare plates by the gelatino-bromide process which shall be more sensitive than wet collodion?" ——We reply: while much useful information concerning the preparation of very sensitive gelatino-bromide has been published, we should not be warranted in saying which is the *best* process.

T. G. W.—Why not obtain one of the lenses on trial? You err in supposing that we possess an intimate acquaintance with the various classes of lenses manufactured in London; for, on the contrary, our knowledge of them is in many instances a mere *catalogue* one. However, as we have the various catalogues at hand for reference, we are enabled to offer all the advice you will probably reqnire.

H. W.—For painting magic lantern transparencics a retouching desk forms one of the very best appliances we have seen, for all the conditions demanded by that class of work are fulfilled in such a desk. The transparency should be laid npon a well-selected plate of opal glass, by which the effect of even the most delicate touch with the brush will be plainly perceptible. We are, of course, alluding here to retouching desks of the most perfect and improved class.

G. M. D.—By "intensity" we meant the diameter of the lens compared with its focus. In the instance you give, No. 3 has nearly five times the intensity of No. 2; that is to say, the image is formed by nearly five times the number of rays, or the light power, transmitted by the other. In reply to the third question: for photographing by artificial light select a lens having a large aperture and a short focus, and let it be such an one as will work without a diaphragm.

Thomas Chilton (Manchester).—Our correspondent directs our attention to the fact that he has in his paper *On the Gelatine Emulsion Process*, published in our issue of last week, page 618, omitted to state the focus of the lens he employed. This omission he now supplies by stating it to be six inches. But if Mr. Chilton will glance at his paper again he will find that he has really given much fuller information than he imagines, for he states that he employs a single lens with a stop $\frac{f}{24}$. Knowing the ratio of the aperture to the focus, one does not require to be told the focus of the lens, because $\frac{f}{24}$ is a definite degree of luminous intensity, no matter what kind or focus of lens be employed.

Thos. Stuart.—A "line" is the twelfth part of a French inch. This latter being a little longer than an English inch, you may very safely estimate thirteen lines to our English inch. We are aware that dealers in French optical goods roughly estimate twelve lines to the inch; but this is slightly incorrect, unless coupled with the foregoing explanation. Forty-five lines equal about four of our inches. This measurement, although not absolutely precise, is sufficiently so for your purpose.

J. W. Kirby.—1. We are trying some experiments in the same direction, and hope to publish the results very soon.—2. The special kind of lime light mentioned will prove totally inadequate for the purpose of taking portraits. It will be a good plan for you to initiate your experiments by igniting a piece of magnesium of a definite length, and holding it a certain measured distance—say thirty inches—from the face of the sitter, of course making use of a reflector to prevent any of the light being lost. The results obtained under these conditions will serve as data for extending your basis of action. In the early days of magnesium photography Mr. Brothers introduced a large reflector made of tin, having a handle conveniently fixed behind it, and an arrangement in front, by which to suspend tapers, formed of twisted magnesium wire or riband.

An Actonian inquires whether, when in using a 10 × 8 old Voigtländer lens (which is considerably over-corrected) for copying a map, it will give a copy the precise dimensions of the original. He does not state his requirement very plainly, but we quite well understand what is meant.——In reply: If the visual image—that is, that which is seen in sharp focus upon the ground glass—be adjusted so as to be of the same dimensions as the map, as the picture would not be sharp owing to the over-correction of the lens, it would become necessary to remove the sensitive plate to a greater distance from the lens than the focussing-screen was; and as the rays of light diverge from the lens, so would the finished picture be larger than the original. If "An Actonian" has access to an Almanac for 1870 he will find the subject there treated of, and also a method by which such a difficulty as that here stated can be obviated.

Received.—George Lawrence Burge, W. A. Brice, and J. P. D. In our next.

Photographic Society of Great Britain.—At the next meeting of this Society, to be held on Tuesday next, the 8th inst., at 5, Pall Mall East, Mr. Edward Viles will read a paper on *Microphotography*.

RECENTLY-PATENTED INVENTIONS.

October 29, 1877.—"Certain Improvements in the Production of Typographical Etched Plates, Reproducing Photographs from Nature or from Copy. No. 4009."—E. Capron, L. Duvivier, and N. Ponsolle.

November 9, 1877.—"Photographers' Head Rests or Supports. No. 4196."—T. P. White.

November 21, 1877.—"Improved Arrangements or Means applicable to Producing Enlarged Pictures and for Taking Pictures by the Agency of Light. No. 4367."—F. H. Warlich and J. W. J. Cadett.

November 21, 1877.—"Improvements in Photographic Printing Frames, and in Apparatus used in connection therewith. No. 4380."—T. G. Hemery.

December 22, 1877.—"An Improved Method of Taking Binocular or Space Photographs. No. 4877."—C. H. Lehmann.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For the Week ending January 2, 1878.

These Observations are Taken at 8.30 a.m.

Dec.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
27	29·61	W	—	32	39	29	Hazy
28	30·06	NW	—	32	50	28	Dull
29	29·64	SW	49	50	54	30	Dull
31	30·03	NW	39	42	46	40	Hazy
Jan. 1	30·34	NW	36	37	46	32	Foggy
2	30·35	W	45	46	—	35	Dull

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 923. Vol. XXV.—JANUARY 11, 1878.

ON THE ACTION OF VARIOUS BROMIDES AND CHLORIDES IN EMULSIONS.

The recently-published researches of Captain Abney upon fog-producing emulsions, and the fading of the impressions upon exposed films, have called our attention once more to the subject of the salts employed in forming the silver haloid. Though it was at one time supposed that the base of the soluble haloid used in salting the collodion produced little or no action upon or variation in the nature of the sensitive film, the impression has long been gaining strength that such action is produced, and that, in fact, the question of the proper salts to employ for the purpose is one of the greatest importance.

Some few months ago, at page 362 of our last volume, we devoted an article to the subject, since which time we have repeated and varied the experiments therein described, and now that the matter has once come under notice we propose to give a further account of the results thus obtained. As will be seen by reference to the article in question our experiments were divided into two classes, having as their bases the correction of emulsions fogged respectively by excess of silver and by exposure to light, and these may be taken as representing the two classes of phenomena treated by Captain Abney in his separate papers. We do not intend here to go into the question of the actual cause of the fog in either case, simply remarking that it may be due in each instance to the formation of sub-bromide of silver; but it is evident that the *whole* conditions are not identical in both cases, hence we have continued to follow the two distinct lines of experiment.

In the first course we have varied the conditions only to the extent of reducing the excess of silver to such a point that it required several days for the emulsion, even without restraining acid, to develope unmistakable fogging propensities; but the result at that stage was such that under some circumstances of subject and exposure the fog produced would not prove sufficient to seriously interfere with the quality of the result. The character of the emulsion was, indeed, such that if a sufficiently full exposure should be given to render the development rapid and to require no "pushing," the fog had not time to make itself apparent; but the slightest prolongation of the action of the alkali, whether from under-exposure or difficulty in gaining density, was sure to produce a veil of more or less opacity. In this manner we obtained an emulsion more easily susceptible, we think, to the weakest action which might be exerted by any of the salts used to remove the fog than if its fog-producing power had been greater.

This emulsion was divided into several portions, which were treated respectively with the chlorides of zinc, copper, cobalt, and ammonium, and with the bromides of copper, zinc, cadmium, and ammonium, in the proportion of half a grain of each to the ounce of emulsion. The various samples were set aside and examined at intervals in order that we might note the length of time occupied by the different fog-removing agents, the rapidity of the two classes of which was found to be in the order we have named them. Of the chlorides that of zinc acted most rapidly. Our first trial, made six hours after the addition of the chloride, showed that the emulsion had sustained a decided improvement; it gave no sign of fog, as we are accustomed to accept the definition, but the image failed to exhibit the clearness and brilliancy we like to see in an emulsion. A general softness, accompanied with a slight but not objectionable veil, marked the early stage of the development, while a strong tendency to fog under the intensifier rendered it almost impossible, except with a long exposure, to obtain printing strength. Subsequent trials proved that the maximum effect of the chloride had been obtained within the first six hours, as no further improvement was afterwards noticeable.

The chloride of copper continued its improving action during a further period of seven or eight hours, when the maximum was reached. The emulsion was then in a far better working state than that treated with zinc chloride, but still failed slightly in the same respects as the latter. Chloride of cobalt attained its maximum effect in about forty-eight hours, but was then inferior in working qualities to either of the preceding. Chloride of ammonium appeared capable of producing little or no effect, even after several weeks' action, the emulsion being at the present time in such a state that to obtain a clean image of moderate density a very long exposure and strongly-restrained developer are necessary.

Turning now to the bromides, we have to record a different class of results. Anticipating greater rapidity in the fog-removing power, we commenced testing these samples one hour after correction; but it was not until three hours had elapsed that the first emulsion became clear. In this case the copper salt was the most rapid in its action, zinc following next, its function being performed in a little over four hours. The image obtained from these two emulsions after the times named was all that could possibly be desired as regards freedom from fog and the various good qualities directly or indirectly connected therewith, while as regards rapidity and power of giving density they were in no respect wanting. The emulsions were, in fact, in every way as good as could be obtained with the same materials and the same formula.

The sample treated with bromide of cadmium cleared much less rapidly, but after two days' rest gave a clear, bright image, possessing great delicacy and that peculiar "bloom" or veil which some prefer. It continued to gain in clearness for some days, but so gradually that it was impossible to decide when it reached its maximum; at the end of a fortnight, however, it was perfectly indistinguishable from the last two samples. Bromide of ammonium appeared to act but little differently from its corresponding chloride, and after a lapse of several weeks has proved incapable of removing the slight fog originally existing in the emulsion, though if it be possible to so speak of a practically useless result it shows greater promise than the chloride.

In a second series of experiments an emulsion was prepared with excess of silver, and restrained by the addition of one drop of nitric acid to each ounce. It is noticeable that in this case it required a larger excess of silver and a much longer time to produce an emulsion in which the fogging propensities were sufficiently marked to render the experiments of any value. In the previous course the original excess of silver was extremely small—probably not one-fifth of a grain to the ounce—but just sufficient to completely convert the whole of the soluble bromide, after allowing several hours for complete combination. In this instance, however, the excess reached as nearly as possible two grains in each ounce above the theoretical equivalent required, and the emulsion did not then arrive at the fogging stage until forty-eight hours after sensitising.

In all probability by employing a smaller excess of silver and allowing a longer time the same result would have been arrived at—that is, the production of fog—for we believe that an acid *per se* is incapable of altogether *preventing* fog, but only acts temporarily in restraining or retarding its production. However, for our present purpose, that point is immaterial. At the time of adding the "correcting" agent it suffices that the emulsion was in a "foggy" state, and our object was to compare the effects of various salts in restoring it to its pristine brightness.

For this purpose the emulsion was divided and treated as in the last case with varying proportions of the same series of salts, the quantity of each being calculated to leave an excess of about half a grain above the exact quantity necessary to neutralise the excess of silver. The first and chief difference in the results obtained with the acid emulsion was that the whole of the salts were effectual in removing the fog. Next their order of rapidity was altered, the chlorides performing the clearing in the following order:—Copper, zinc, ammonium, cobalt. The bromides: copper, zinc, ammonium, and cadmium. There was less difference in the proportional rapidity of the various salts than in the case of the neutral emulsion, the chlorides occupying a longer time than the bromides. The latter produced their maximum effects in from fifteen to thirty-six hours, the former requiring between twenty-four and forty-eight, with the exception of cobalt, which required nearly three days and a-half, or about eighty hours.

Since reading Captain Abney's paper we have tried iodine and bromine in the free state, as suggested by him, with, in each case, the total elimination of the previously-existing fog. The experiments having been, however, made with a different sample of emulsion from those already recorded, and at different times, can scarcely be placed in comparison, It may be remarked that we failed to detect anything in the behaviour of the bromine-treated emulsion which would indicate the formation of bromal; on the contrary, we are inclined to give bromine the preference over iodine, as not only performing its function more rapidly, but as producing less injurious action upon the sensitiveness.

We shall be compelled to hold over until next week the remainder of our experiments and the deductions we have made therefrom.

LIQUEFACTION OF ALL GASES ACCOMPLISHED.

With respect to the event we dwelt upon last week—the liquefaction of oxygen—which has been of the most surpassing interest to *savants* over the whole civilised world, further particulars by M. Raoul Pictet are now to hand of the circumstances under which his experiments were conducted; but all are cast in the shade by experiments conducted before some of the leading chemists of the day at the Ecole Normal, by M. Cailletet. M. Pictet sounded the knell of "permanent gases," and M. Cailletet was at their death.

On the last day of the old year the remaining two "permanent gases," hydrogen and nitrogen, were liquefied by means of the apparatus the latter had erected; and the assembled chemists saw for the first time in the history of science actual drops of nitrogen, and, finally, liquefied hydrogen, which emerged more in the form of a misty cloud. A new epoch in science dates from these startling and marvellous events, which afford the most convincing truths of some of the grandest theoretical conceptions that have illumined the present century,

It is a very remarkable fact that some of the greatest discoveries in science have been announced almost simultaneously by two different workers. Just as the priority of the discovery of oxygen by Priestley has been called in question, so the first liquefaction of the same gas has given rise to rather angry discussion. M. Pictet publicly liquefied oxygen, but it appears that a sealed note had been delivered to the Paris Academy by M. Cailletet on December 2nd, stating that he had liquified that gas, and describing the process he made use of.

It is evident that equal honour is due to each of these learned investigators, though as an absolute matter of fact the process described in the sealed packet only allowed the production of a cloud of oxygen. This, of course, must be composed of minute drops of liquid, yet it hardly comes under the category of liquids, while the other experimentalist obtained actual jets of liquid. True, they were not confined and collected; but they were seen by every one present as unmistakable drops. The next feat to perform will be to collect these drops, and make a portable liquid of them, and this we do not doubt will be very soon done.

The actual present connection from a practical point of view of these great events with photographic operations may not be clearly seen, but they are pregnant with possibilities the date of whose realisation cannot be predicted. Many ideas connected with this aspect occur to us as we write, but it is rather early to give them journalistic form.

[By a misprint in our last the gas generator in the form of a *shell* was termed a "*shelf*."]

FILTERING MEDIA.

The introduction, not long since, of a new filtering medium in the shape of the so-called "glass-wool" led us to think that a short disquisition on the various media suitable for purposes of filtration would be useful to some of our readers—the more so as the glass-wool, though of considerable utility, does not possess sufficient corresponding advantages to set against its price, which at present is something close upon ten shillings an ounce.

The chief materials used at the present time are—dividing them into two classes, organic and inorganic—various fibres of animal or vegetable origin in the first; and, in the second, glass, sand, rock crystal, asbestos, and charcoal, all in various states of fineness.

Foremost among all these useful materials is to be placed the indispensable filter paper, which is now rarely to be seen in any shape but that of the circular pieces obtainable from all the dealers. Few of our younger readers, to whom the circular form seems a matter of course, can imagine the trouble and waste that was experienced in the laboratory or dark room prior to the advent of this most useful mode of selling and storing filtering paper. It is to be obtained of various qualities—the hard, firm-textured being the best to select, and the kind with a radiating water-mark is rarely made other than of good quality. Up to about ten or twelve inches diameter they may be folded and placed in the funnel without special precaution being taken, beyond being careful, while folding, not to crush the point too much, as it is liable to burst in use if at all weakened in that part. Beyond twelve inches in diameter some support is needed for the point; and in all cases the liquid should be poured in so as not to fall upon the point. At the late exhibition of the Photographic Society of Great Britain an ingenious filter was exhibited, which combined the strength of a woven fabric and the filtering power of paper by combining the two, the ordinary circular filter being backed up with strong muslin. We are inclined to think, however, that this method is inferior to one brought out by Mr. Waters, of Troy, New York, some years ago, which consisted in embedding, in the *centre of the filter*, in the process of the paper-making, a piece of lace between two thicknesses of the paper, the fibres of the latter intermingling with the lace so as to form a practically unbreakable sheet. The same gentleman also introduced a method of so strengthening the point as to make it impossible to break by folding.

Next in order after paper come raw fibres, such as cotton wool. This material has many advocates for its superseding every other medium; but, though it is useful enough in its way, it is only so in a minor degree. A pledget of cotton wool inserted in the neck of a funnel is useful for clearing grosser particles from a liquid; but if it be required to render a turbid liquid thoroughly clear it will take a day to perform what a piece of filter paper would do in a few minutes. Further: it will almost soak up as much fluid as the latter, so that it possesses little claim to attention on the score of economy. Again: it requires very careful placing in the funnel. If too tightly pressed in it will entirely stop the flow of liquid; if too lightly placed the fluid will descend round it and remain unfiltered, and it is by no means always an easy matter to hit the happy medium.

There is, however, another fibre which is infinitely to be preferred to cotton wool in every way. It is fine tow. We do not remember attention having been called to this material at all before, but for all purposes it at least equals cotton wool in usefulness, and in many it far surpasses it. It does not require such nice adjustment to prevent the fluid running away without filtration on the one hand, or not passing through it all on the other. A small plug of this material, pressed rather firmly into the neck of the funnel, filters excellently, and a glass rod passing through the fluid may be used to press or loosen the closeness of packing with the greatest nicety. Let any of our readers try this who have not done so already, and we think they will require no more cotton wool.

It must, of course, always be remembered that quick filtration does not at all imply the most efficient filtration; as a rule, the slower the liquid passes through a filter the clearer it comes out. But cotton wool forms an exception to the rule; for it is very easy to filter a quart of liquid through tow in as short a time as a few ounces through cotton wool and yet be equally clear, the pressure in packing the wool doubtless causing all filtration to stop in the chief bulk of the mass.

Coming to the inorganic filters, we first name the new glass-wool. We have referred to its price. As to its working capacity, it is more allied to the tow to which we have just been referring; but being, unlike the latter, inorganic, there are no combinations of circumstances in which it could, for instance, act upon a bath passing through it beyond that solution of the glass itself which on a former occasion we dwelt upon. We do not, however, think it at all likely to be useful to photographers; its best place is in the laboratory of the chemist.

Next we have asbestos, which is quite as practically useful as the glass-wool and not a twentieth of the price. It is a natural product, found in an aggregation of brittle, fibrous-looking crystals which are unacted on by most chemicals. (There are many kinds of abestos, the name really being given on account of the form rather than the chemical constitution.) It may be used with advantage for filtering anything, from the strongest acids or the nitrate bath to pure water. Glass and rock crystal, powdered, and sand form in effect a single class, their action being alike. They are very efficient when large quantities of liquids are to be cleared; but for occasional use paper is to be preferred unless the same filter be employed; and this we think hardly worth while from the trouble that would have to be taken to preserve the filtering bed from disarrangement and contamination with dust and other foreign matter. Rock crystal, which can be easily obtained from the clippings of the spectacle-makers, is therotically preferable to glass on account of its insolubility in water.

Sand requires to be well washed to free it from salt, and to be treated with hydrochloric acid to remove various lime salts and other materials deemed necessary to be expelled. It is not an easy matter to pound glass fine enough for the purpose; but if it be made red hot and then thrown into water it becomes very brittle, and capable of being broken up with the greatest facility.

To use these materials it is necessary, first, to prepare a bed of larger pieces of glass in the neck of the funnel, covering them with a layer of finer, and so on till the uppermost layer consists of the finest powder. It filters well and quickly, but is open to the objections we have named.

There remains now only charcoal to be treated. Its chief use is as a purifying material, in which direction it is more employed than for its mechanical properties. It forms an ingredient in many commercial filters, which, however, can scarcely be brought within the scope of this article; but there are not so many cases where it would be used in photography, seeing that distilled water should not require its aid, and the other waters where it would ordinarily be useful are not thought to require special filtration. In ending our brief survey we think our readers will agree with us that filtering paper still forms, and will for some time to come, the staple filtering medium for photographic purposes.

RECENT PATENTS.

No. III.—A VIOLET-COLOURED VARNISH FOR PHOTOGRAPHY.

Seeing the name of Sig. Scotellari appended (along with that of M. Puttemans) to a patent headed "Photography," we naturally concluded that it would have something to do with the violet-coloured, translucent lens caps associated with the name of the former gentleman. In this, however, we find we were mistaken, for the specification (for which provisional protection only was obtained) is confined to a certain method of—or, more correctly speaking, a violet varnish for—enamelling or varnishing glass, paper, and other materials, the connection of which with photography is stated to consist in causing the light to pass through them "for the various manipulations in photography."

The violet varnish is made as follows:—

Take two ounces of powdered copal gum, six ounces of essential oil of lavender, two grains of camphor, and essence of turpentine in quantity according to the consistency of the mixture wished; mix dragon's blood infused hot with the varnish, and add prussiate of iron—these two ingredients according to the shade of violet colour required. The mixture is then to be put into a thin glass bottle, or other convenient receptacle, with the lavender oil and camphor, adding to it the powdered copal in small portions as each is dissolved in the liquid, stirring the mixture continually with a stick of white wood or other material. When the copal is incorporated with the oil add by degrees the essence of turpentine in a boiling state. The mixture must be filtered, and when cold is ready for use. It can be applied to glass, paper, linen, metals, and other materials.

Bearing in mind the fact that this received provisional protection only, photographers will not be sorry to be put in possession of what appears to be a good formula for the preparation of a transparent violet varnish.

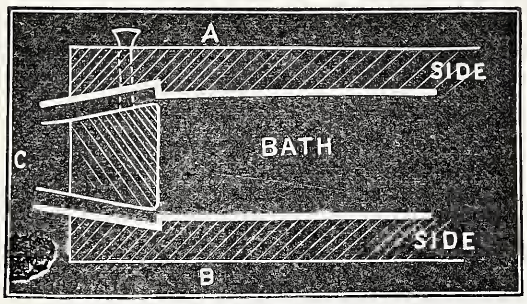
Our readers will remember that in the course of a paper read before the last meeting of the Edinburgh Photographic Society, by Mr. Norman Macbeth, the author spoke very favourably of the use of emulsions, both of collodion and gelatine, for portraiture. In the course of his paper Mr. Macbeth gave his experience with washed collodion emulsion, and spoke of the organifier of alkaline albumenate of silver, recommended some little time ago by Mr. J. C. Roche, as an accelerator when applied to the wet emulsion plate. It is well known that a very high degree of rapidity is claimed by many for the wet emulsion plates—a rapidity, indeed, far surpassing the ordinary wet process; while, again, others declare that there is no gain whatever as regards sensitiveness in employing the emulsion in the moist state. Possibly each side may be correct in speaking as they do from their own experience, for there is not the slightest doubt that the original character of the emulsion has a very great deal more to do with the rapidity than many suppose. A merely *moderately* sensitive emulsion, whether washed or unwashed, cannot by any subsequent organifying or "accelerating" be made to yield the extremely rapid results claimed by some; it is necessary that it be in the highest possible state of sensibility previous to such treatment. Again: it is optional whether the plate be merely immersed in water before exposure or whether it be treated with an organifier; and here another element of importance is introduced. If a simple immersion in water be adopted, or an organifier of plain albumen or gelatine, some emulsions show a large increase in rapidity over the dry plates, others no difference, except, perhaps, in the ease of development. But when an alkali is introduced into the organifier the increase of sensitiveness occurs in all cases, though it varies in extent according to the nature of the emulsion. After a number of careful trials we have arrived at the conclusion that Mr. Roche's organifier owes its accelerating effect *solely* to the alkali it contains and not to the silver, the only action of which is upon the colour of the deposit, while it has a strong tendency towards the production of stains and spots, especially if the plate be kept long before development.

PRACTICAL HINTS FOR PHOTOGRAPHING IN HOT CLIMATES.

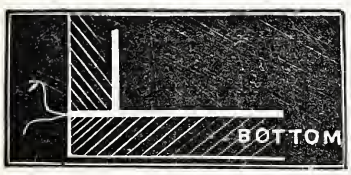
Every groove in photography seems to be well explored and the results published in all sorts of ways and by-ways, and if one be short of this kind of knowledge it is the fault of either not reading the journals attentively or not reading them at all. Simple little matters connected with the photographic outfit are recorded as very important subjects to be acquainted with; and so they are, particularly when you are a few hundred miles away from a photographic ware dealer, and perhaps thousands from the particular thing immediately wanted.

The photographer who wants an almost imperishable "field piece" must look to the ALMANAC for 1876, where I have shown how to put together a wooden bath with sheet india-rubber lining. I have one in use, and a serviceable article it has proved. But out here, where the normal temperature of the atmosphere is about equal to the inside casing of a "Howarth's patent hot-air stove," just replenished with fuel, the menstruum for rubber, such as benzole, naphtha, &c., is very difficult to obtain in the first instance, and equally so to keep when you gain possession of it; hence my india-rubber lining idea loses some of its simplicity of construction. I have, therefore, looked about for a substitute for sheet india-rubber, and found it in wax cloth.

Waxing the wooden bath is an old idea (I beg Mr. Stillman's pardon—it was new once), but it came off just where you don't want it. The dipper dislodges a little, which floats on the silver solution waiting to be received on the next collodionised plate. The other place where it also comes off cannot often be found; but it is evident enough it does so, or the silver solution would not drop from its receptacle so copiously. My notion of a perfect bath is this:—



The diagram shows the front, *a*, and back, *b*, with one end, *c*; depth, &c., according to requirement. Take white wax and use the flat iron unsparingly on it in driving it into the pores of the wood; then lay a piece of strong calico, which is here represented by a thick black line; apply more wax and the flat iron again, and it will then adhere to the wood like a skin that was born with it. Screw altogether and afterwards trim the ragged edges of the cloth, leaving the bottom a little long, so that the bottom wood can be screwed on, as in the diagram.



The Aryian brethren of this country are not born philosophers as a rule, but my table servant wakened me up to a sense of my ignorance on one scientific point. In very hot weather, with a scorching wind, the bottles of bitter beer are cooled by being placed in either wet grass or wet cloth. Evaporation goes on quite rapidly, as the wind blows strongly upon it. Acting upon this hint I wrapped my nitrate of silver bottle in a shroud of flannel, placed it in a dish of water an inch deep, and opened the window to catch the breeze. Call this "Gough's refrigerator" when you are delighted with it, and my ambition seeks no greater distinction as an "inventor."

Warming the Bath.—A hot "bath" is about as unnecessary as hot grog, one would think, in a climate like this. To know how to do it when coals are scarce is a wrinkle worth attending to. Put a black cloth round the bottle and place in the sun for a few minutes. Now blow through a glass tube dipped into the solution till it bubbles and up violently. In two minutes all ether and alcohol have departed, you have that article much commended "as better than a new bath."

Cool Collodion.—Wrap a piece of wet flannel round the bottle, and as sure as it dries so sure will the collodion become cooler. If I extend this article in length I might affect your readers with something like chilblains. J. W. GOUGH.

Darjeeling, India.

NOTES ON PASSING EVENTS.

BY A PERIPATETIC PHOTOGRAPHER.*

WRITING by the light of the triple-wick lamp, recently patented by Mr. Hughes, I inquire whether he has adopted the best form of chimney that might be devised for the twofold purpose of effecting combustion and transmitting light. A glass cone in proportions similar to a sugar-loaf may answer quite well for surrounding the wicks, but would not its proximity to a flame possessing such an intense degree of heat as a triple-wick must give cause it to run a constant risk of being fractured? To this it may, perhaps, be replied that if the glass cone be sufficiently large in diameter it will not get over heated. True; but neither could the flame be brought sufficiently close to the condenser to yield its light properly. It seems to me that every end would be secured by making the glass cone of metal (forgive the Hibernicism), such as thin brass or tin, and having an aperture in one side to allow the light to pass out to the condenser. This aperture might be closed by a small, flat plate of glass, say of the dimensions of the transparencies, and if this were allowed to drop loosely into a guide or groove in front, or even be inserted in the same manner as that in the sciopticon, all the advantages of the present cone would be secured *plus* the further additions of freedom from breakage and facility of replacement. I have spoken of a "cone," but the suggested metallic chimney need not be a cone at all, but be perfectly cylindrical in form. I am glad to see a more powerful lamp being applied to the lantern; for, as every exhibitor is too well aware, something better adapted for drawing-room or small school-room exhibitions than ordinary oil lamps, and yet possessing their simplicity and facility of management, was badly wanted. Query: seeing that a triple-wick lamp gives a light so much superior to one having only a double wick, is there any reason why a still greater number of wicks—say four or five—should not be pressed into the service of the lantern? The heat would be very great, but that would be a small matter in connection with a well-ventilated lantern and room.

The idea of providing "adapters" for camera dark slides is so excellent that I trust to see some of the well-known ingenuity of our camera-makers expended in that direction. Like the "friend" of whom the editors have spoken, I, too, am the possessor of a number of sets of slides which I should like much to be enabled to use in conjunction with a certain camera for which they were not made, and yet which I dare not have altered to suit them. If such an adapter were available, many photographers would be very glad indeed to embody them among their *impedimenta*, and I hope, at no distant period, to find that among the various ingenious pieces of apparatus which from time to time are exhibited at meetings of the photographic societies this one will also be found.

A simple piece of apparatus, devised by Mr. J. H. Taylor, for cutting a pair of carefully-trimmed stereo. prints out of a large binocular negative, will be welcomed by those who use a cabinet-landscape size of plate for taking binocular views of subjects which cannot so well be represented in the single or monocular form. To ascertain the *full* value of this apparatus, however, it will be necessary that the manipulator acquire the art of being able to view a stereoscopic picture by the operation incorrectly designated "squinting." This will enable him to place the apparatus or guide plates down upon any uncut binocular picture, and, having placed *one* of the apertures over that portion of the picture selected, a "squinting" glance at both will show whether the conditions of correct stereoscopic projection will be properly carried out; for, if not, the width of the two masks can be almost instantaneously adjusted so as to produce *any* effect. For this reason, the apparatus to which I have referred will prove very useful.

In a paper read before the Manchester Photographic Society, Mr. Thomas Chilton complains of "frilling of the film during development" as being one of the drawbacks attending the practice of the gelatino-bromide process. This is a disease that appears to be very little understood. At one time I had several plates "frilled;" *now* I never see such a defect. This is all very well so far as it goes; but here lies the special annoyance—I am quite unable to say by what means I have obtained immunity from the evil in question. I work precisely (so far as I am aware) in the same manner as I have always done, but whereas in my earlier trials of the process I occasionally got a negative which had a little frilling round the margin, I have long ceased to be troubled in this respect. My method of development is exceedingly simple. Fixing the plate upon a holder I allow water from the tap to play upon the surface until it is made thoroughly wet; I then apply a four-grain solution of pyrogallic acid, containing one drop per ounce of a very much diluted solution of carbonate of ammonia. The picture appears with quite an easily-managed degree of rapidity, and is checked or aided by bromide or ammonia according to its appearance. When the details are all out, but still very thin, I wash, fix, and intensify with acid-pyro. and silver. I prefer

* Concluded from page 6.

this method to bringing the picture up to its full intensity by alkaline pyro.

Concerning the Kennett patent Mr. Chilton does not appear to be quite conversant with the facts when he speaks of it thus:—"Owing to the non-validity of Kennett's patent, it having been declared void," &c. The patent in question was not "non-valid" in the ordinary acception of this term; it was simply allowed to lapse at the termination of the three years for which it was obtained. True, Mr. Kennett might easily have extended the duration of his patent for four years more, and after that for a further period of seven years, but these extensions are attended with the somewhat stiff fees of fifty pounds and one hundred pounds respectively. This course he, wisely, did not adopt, but allowed his patent to *lapse*. This, it will be seen, is a very different thing from its having been "declared void" through "non-validity"—a term which conveys an erroneous impression. The patent authorities would have been only too glad had he not allowed it to lapse, as they would thereby have been a hundred and fifty pounds the wealthier.

HOW TO EMPLOY PHOTOGRAPHY AND THE LANTERN AS EDUCATIONAL AIDS.

No. II.

At the present day, when our students have to "cram" for, if not master, many more subjects than were required at "exam's" in olden days, the teacher, if he would go with the times, must seize upon every available "tool" that can be made to do service in the cause of education.

"Sight knowledge," or that which can be imparted to the brain through the eye, plays a very important part in every person's education, whether it be scientific, technical, or worldly. Thus, if once we have well examined a specimen of natural history, we readily recognise it again or any other specimen of the same species. Again: if we have visited any place, at home or abroad, on its being named we can at once conjure up "in the mind's eye" all its characteristics as if we were looking upon a photograph of the spot; and, more familiarly, if Jones has once been introduced by Brown to Robinson, both Jones and Robinson ever after, through sight-knowledge, mutually recognise each other whenever they may meet. Further: the shop windows make us familiar with the photographic portraits of men great in the political, literary, scientific, religious, legal, or financial world, and if by accident we meet any of such celebrities the chances are we at once recognise them, through the sight-knowledge we have acquired from their photographs.

This gives us the key-note as to how we may make *truthful* delineations of rare objects, of far-distant places, or of events long since passed away important implements of education, as they afford the necessary sight-knowledge, which in many instances could not be imparted in any other form. But that word "truthful" means a very important element in the whole story; for no pains must be spared to procure accurate data, even to the most minute detail, if we wish to do justice to the student and give this system of teaching a fair trial.

Here I must protest against the employment of *very* cheap slides, for, as a rule, such must mean poor drawings and worse colouring. An *educational* slide ought not to be one of those things in which the maker has, like "Caleb Plummer," the doll-maker, "to go as near to natur' as he can for sixpence." Careful drawing with due attention to data, good negatives, clear positives, and artistic painting must be paid for, as sound teaching will not admit of the ship being spoilt for the sake of the ha'porth of tar.

It may be asked—"Are slides to take the place of objects in teaching?" To this question I think the answer must be—"As a rule slides should supplement, rather than take the place of, objects, unless the desired objects are unattainable by reason of their rarity, great money value," &c. Thus, if I had a school museum, I should not wish to disarrange carefully "displayed" specimens placed in the cases, but I should employ a set of counterpart slides when lecturing on the contents of the museum cases; for, on account of the large size of the lantern diagrams, I could better point out to a greater number of students the characteristics of the specimens than if I employed the specimens themselves, and, having thus "primed" each student as to *what to look for*, I should request my class to examine the specimens themselves in detail and with due care.

If I wanted to show the skeleton of an elephant, on account of the size and cost of a real specimen I should make a slide play substitute in the museum as well as in the lecture room. If, on the other hand, I were travelling on a lecture tour, then specimens would be an incumbrance, and I should employ lantern diagrams alone. Undoubtedly it is always desirable for a student to examine the absolute object itself, and the next best thing is to be taught from a truthful delineation of the same. That this may be done with advantage I need only refer to the success of Dr. Carpenter's Gilchrist Trust and Sweeny's Geological Lectures, which were entirely illustrated by lantern diagrams of fossils, restoration of extinct animals, and of the probable aspect of the surface of the earth at different geological periods, of the physiognomy of mountain masses of various mineralogical constitution, glacier regions and action, coral reefs, &c., which otherwise would have required an extensive museum and field excursions to all parts of the globe for their equivalent illustration.

It has been asked—"At what point in the education of a scholar should the use of the lantern be introduced?" I think those who are conversant with the value of this system would make answer—"At the very beginning, so as to supplement the *Kindergarten* of the primary school, as the latter should supplement the museum of the collegiate school."

I never could understand the necessity for making instruction a matter to be abhorred by the pupil, through being presented in form so dry that it became difficult to swallow; nor could I ever understand the necessity for the teacher assuming a high and dry, stilted aspect of extreme severity that destroyed all sympathy between pupil and teacher, and simply made the pedagogue one to be dreaded instead of loved as a friend of youth. Nor could I ever understand why the youthful mind should be so overloaded with task work that, if honestly mastered, it would keep the brain on the strain from nine o'clock in the morning till twelve o'clock at night, with the exception of the hour given to dinner and play and the half-hour given to the evening meal. I say, "honestly," because we all know that such over-tasking never was done thoroughly, but by hook or by crook the work was "fudged," though apparently gone through. Such a system of teaching must lead to superficial knowledge, whilst "thorough" ought to be the motto of the skilled teacher. A moderate amount of instruction thoroughly mastered by the pupil will (what in the slang of the school is termed) "stick," whilst the over-cramming system will produce nought but Dead Sea fruit.

The manner of carrying out illustrations in each department of education for which this system is adapted will next claim our attention. Samuel Highley, C.E., F.G.S., &c.

NOTES FROM AMERICA.

Curiosities of Science.—Lighting the Studio with Yellow Glass.—Talbot's Engraving Process *Redivivus*.

Under the heading of "Curiosities of Science" the *New York World* describes how, at a recent meeting of the New York Academy of Sciences, Professor J. S. St. John illustrated a new application of dry-plate photography in preparing without a camera glass transparencies of sections of fossils for projection. Slides of sponges and corals prepared by this method were exhibited, and showed the delicate sections with great accuracy. Professor St. John did not fully explain his application, but Professor Newberry, president of the society, said that the discovery, which it really was, would prove to be of great benefit when Professor St. John should see fit to make it public.

All this is correct enough, but we imagine that it will scarcely in this country be classed as a "new application" of photography. It is a long time since sections of fossils for projection by the magic lantern were prepared in the following manner, which, so far as we can see, covers the ground referred to:—The section, which may be one of a fossil or any other partly or wholly translucent mineral, having been mounted upon a glass plate is used as a negative for printing upon a dry-plate by superposition, in the same manner as leaves, lace, and other flat objects which have been used as negatives to print upon *paper* ever since the earliest experiments of Mr. Fox Talbot. It is certainly ten years since fossil sections were applied to a similar use—not merely upon paper but upon sensitive dry plates; and we are aware of several sections of this kind having been photographed upon glass in the manner indicated with the view of their being submitted for examination at an early meeting of the Royal Microscopical Society. It may here be observed that by making use of the bromised emulsion process the resulting picture may be either a negative or a transparency, according to the way it is treated after its primary development.

"And what next?" inquires the *Photographic Times*, who, in speaking of the interposition of yellow glass between the sitter and the light by which he is to be illuminated, continues:—

Not content with blue, purple, and rose-coloured glass, some brave personage has suggested that if the glass in the skylight be tinted a pale bright yellow that it will be just the thing. We have as good a right, we suppose, as any one else to make a suggestion, and, therefore, we suggest that those who so continuously hanker after colour would do better to paint their studio glass entirely black, then shut up shop, and clear out of the business. We guarantee if this be done that their models will never complain of the light hurting their eyes, although the tears may come to them before the exposures are sufficiently long. The effect could be increased by scratching star-shaped apertures through the black. We are prepared to defend this method on scientific grounds.

This is the manner in which Mr. F. A. Wenderoth, in the *Philadelphia Photographer*, gibbets a photo-engraving process which has been "resurrected" by Mr. Jose Julius Rodrigues. Under the heading *Honour to Whom Honour is Due* Mr. Wenderoth says:—

It is astonishing with what coolness, expressing it mildly, some people appropriate the labour of others. In last month's number of this journal there is published an article headed *Photographic Process Giving Half-Tone*, a translation of a paper presented to the Belgian Association of Photography by Jose Julio Rodrigues.

This *new* process was invented and patented in England *only twenty-five years ago*, in 1852, by none less than the great Fox Talbot, and in Muspratt's *Chemistry* (English edition) under the article "Photography," division "Photo-Engraving," one can find the process given in almost the same words as published in this translation; also, in Ure's *English Cyclopædia*, ditto in Appleton's, under the head of "Photography," and in the opening article of last month's number, in an obituary of the late Fox Talbot the same process is alluded to.

If Mr. Rodrigues had introduced a new feature or improvement, no matter how small, he would have been entitled to some consideration, but as it is it is an unblushing "steal." If it was not for the fact that this process introduced the use of gelatine in combination with chromic salts for photographic purposes it would not merit consideration, as it is valueless for the purposes for which it was intended, being based on an impossibility, viz., to etch the metal surface underneath the gelatine film without detaching it, when, in fact, as soon as the etching agent has penetrated the gelatine film to the surface of the metal plate, and its action has commenced, the support of the film is removed, and it is lifted off, when the action of the etching agent has to be stopped. This explains why only a very delicate impression on the plate is obtained, not deep enough to print from. And of what use is a printing-plate which cannot be printed from? This defect Mr. Talbot was unable to overcome, and that has been the reason for its twenty-five years' slumber. But what use is it to resurrect a process of which Mr Rodrigues himself says, "does not appear to me to be the most useful," and to send a paper all the way from Lisbon (if I understood right) to Belgium to be read about a process he says himself does not accomplish its end; the less so when we have in successful operation photolithographic processes by which half-tones are produced. To cover the metal plate first with the resin powder was rejected by Talbot as preventing the rendering of the half-tones, instead of which he applied the resin after exposure and before etching.

Having made a few experiments in this same direction as long as six years ago, I would advise experimenters that this process is not worth the gelatine to be used, much less the labour necessary to conduct operations so delicate.

FOREIGN NOTES AND NEWS.

A New Paper for Filtering Collodion.—The Inauguration of a Society for the Encouragement of Art Manufactures in Berlin.—A Method of Fixing the Retouched Parts of Negatives without Re-varnishing.—Dr. Monckhoven's Photometer.—On the Conversion of Chloride of Silver into Nitrate of Silver.—A Method of Recovering Silver from a Solution of Cyanide of Silver.

Herr Schröder, the optician, has lately used a peculiar sort of paper, imported from Japan, with much success for filtering varnish, and recommends it highly as a filter for collodion, which runs through it almost as rapidly as water through ordinary filter paper.

For some time back there have been in Munich, Frankfort, and Brunswick societies for the encouragement of art manufactures, under whose protection and superintendence libraries, drawing-class rooms, and other establishments, in which instruction is given to the public in the various art manufactures, have been carried on with much success. In Berlin there was no such society, and its want was much felt in many quarters; so in October last Dr. H. Vogal undertook to organise one. He called a meeting, which was attended by the representatives of the most important manufacturing houses in Berlin, but his proposal did not meet with much favour. It was maintained that the Gewerbe Museum already fulfilled all the functions of the proposed society, and by a majority of voices the project was abandoned.

Some seven of the gentlemen present, however, determined not to let the matter rest there, and accordingly a second meeting was called, consisting of the members of the societies of painters, sculptors, and engravers, and on the 5th of November the society, numbering 200 members, was constituted, Dr. Vogel being chosen president. On the 5th December the society held its first ordinary meeting, 400 persons being present, when Professor Döpler made a valuable opening speech, and a variety of interesting articles bearing upon the objects of the society were exhibited. Photography, as an employer of art manufactures to decorate its studio, to furnish it with backgrounds, frames, &c., was represented by the well-known names of Dr. Vogel and Herren Prümm, Reichard, Liebmann, and Frisch.

In a very long article *On Negative Retouching*, in the *Mittheilungen*, Herr Belitski, of Nordhausen, mentions that for the last ten years, instead of revarnishing retouched negatives to prevent the particles of lead from being removed by the duster or by friction in the course of printing, he makes use of alcoholic fumes to fix the graphite, but does not fume the whole surface of the plate by holding it over a vessel containing heated alcohol, merely conducting a stream of alcoholic vapour over the retouched parts. The contrivance he uses for this purpose is both simple and cheap, consisting, as it does, of a small square tin bottle, having a wooden handle fixed to one side. The bottle is five and a-half centimetres in diameter and ten centimetres in height up to the mouth, in which a good seltzer-water cork should be inserted so as to be quite air-tight; and the cork being bored, a glass tube of about one centimetre in diameter, outside measurement, must be inserted through the hole. The glass tube should have an internal diameter of six or seven millimetres, and the end which passes into the bottle must be cut straight off. About fourteen centimetres from the bottle the tube should be bent almost at right angles so as to form a knee, and at about fifteen centimetres from the knee the free end should be brought to a point having an opening of three millimetres. To use it, the bottle is half filled with absolute alcohol and brought slowly to the boiling point upon a spirit or other lamp. At first the alcohol will condense in the tube, but by canting it carefully backwards it may be made to run back into the bottle. As soon as the condensation in the tube ceases hold the hand flat in front of the opening of the tube at a distance of about a centimetre, and if the apparatus be in proper working order one would feel, as it were, a soft blowing upon the palm of the hand. The plate upon which the retouching is to be fixed should then be placed, varnish side uppermost, at an angle of 45° from the horizontal, and the stream of vapour issuing from the mouth of the pipe one centimetre from the upper slope of the plate. The plate is then moved so that the vapour can be seen to condense upon the retouched parts, which, being matt, become shiny and disappear, or sink into the varnish. If the stream be too strong or the plate be placed too near the opening, or if the current be allowed to play too long on the same place, the varnish, instead of merely softening, becomes partially liquefied and runs, carrying the retouching with it, and there is no other remedy than to wash it all off and revarnish and retouch. With practice this mishap will rarely happen, but the beginner would do well to practice upon some old and useless negatives until he has acquired considerable dexterity. A few minutes after the "burning in," as Herr Belitski calls it, has been safely accomplished the plate may be put in the printing-frame, but it should not be retouched upon again immediately.

In the *Photographisches Archiv* there is an illustrated description of Dr. van Monckhoven's photometer. It consists of a seven-centimetre cube-shaped box E F G H, to which a lid A B F E is attached by hinges. This lid is divided into two parts at C D (*fig.* 2), held together by two hooks at J and J (*fig* 1). At the top of the box there is a flat piece of wood

FIG. 1.

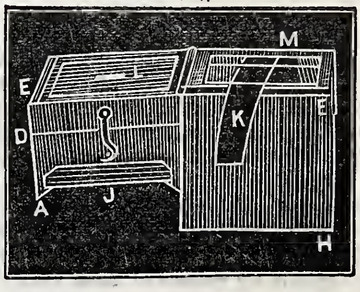
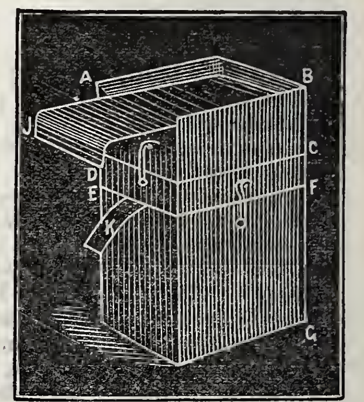


FIG. 2.



gummed to a piece of cloth, and two india-rubber bands, under which, by the aid of a strip of silver paper K, one centimetre in breadth (see *fig.* 1), which lies rolled up in the interior of the box, may be passed. At M beside the strip of paper a piece of paper (something of the colour of blue litmus paper) is placed, and which forms the tint. A plate of glass is let into the lid at L, so that when the instrument is closed it lies flat upon the strip of paper K. Upon the plate of glass a piece of black paper is pasted, from the centre of which a piece one centimetre long and half-a-centimetre wide had been cut. The strip of paper K peeps out through a small opening in the box, and may be further drawn out at pleasure. A piece of ground glass is let into the lid at A B; and above it the sides of the lid are grooved to allow of a metal slide J *(fig 2)* being slipped in and out. The grooves are divided lengthways into ten equal parts, so that when the slide is pushed up to No. 5, as in the diagram, the ground glass is half covered. If the silvered paper be drawn forward, and the photometer exposed to the light until the paper K has assumed the colour of the paper M, which lies beside it, the time required to get a carbon print from a negative is ascertained. If the negative be thin then draw the slide further out, and if the negative be dense push it further in.

The silvered paper for this photometer is prepared in the following way:—Take some good raw Rives or Steinbach paper (44 x 57 centimetres). Dissolve 100 grammes of sodic chloride in two litres of distilled water, and place the paper in it for two minutes. In this way prepare from ten to fifteen sheets of paper successively, and dry in a dark place. Then dissolve in two litres of water 200 grammes of nitrate of silver, and dip the sheets of salted paper into the solution one after another; then turn the whole bundle over, and place it sheet by sheet in the vessel with clean water to wash out the free silver salt. Finally, hang the sheets up again to dry in the dark. The dry sheets are then cut into strips one centimetre wide, and running the whole length of the sheet (57 centimetres), each of which is rolled up separately. Every time that a new roll of paper is placed in the photometer a piece of carbonate of ammonia the size of a pea rolled in a small piece of tissue paper should be put in beside it. The new paper should be placed in the photometer the evening before it is to be used, so that the ammonia may have time to act upon the silver paper, and thus render the paper more sensitive than albumenised paper. Too large a piece of ammoniac carbonate would make the paper yellow.

In the *Journal für Practisches Chemie* Herr Von Bibra says that the following is a good process for changing chloride of silver to nitrate of silver:—Mix one volume of freshly-precipitated chloride of silver with three volumes of freshly-prepared hydrosulphide of sodium, add water and boil for an hour, then filter. Now fuse the whole of the silver containing black residue, and wash it well with water, when a white mass having a metallic lustre will be produced, which, when treated with nitric acid, gives a solution of pure nitrate of silver.

In the above periodical the same writer gives the following as a method of recovering the silver from a solution of cyanide of silver:—Treat the solution with sulphuric acid. The resulting precipitate contains all the silver in the form of cyanide of silver, and should be made red hot and then digested for a short time with nitric acid. From this last solution perfectly pure chloride of silver is got by muriatic acid.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

This Society met on Tuesday evening last, the 8th instant,—Mr. J. Glaisher, F.R.S., President, in the chair. The following gentlemen were elected members, namely, Messrs. W. S. Hobson, Carl Norman, and William Cobb.

In anticipation of the forthcoming annual meeting Messrs. F. Beasley and Robert Murray were elected auditors.

Captain Abney read a paper *On the Theory of the Destruction of the Photographic Image by Time.* This paper was supplementary to the one he had read at the previous meeting, and it had been, meanwhile, sent to the two weekly journals for publication [see our last volume, page 617]. On the present occasion he still further supplemented those remarks by another paper, which will appear in our next. With respect to the latter portion of Captain Abney's paper, some remarks were made by Mr. T. J. Pearsall and Mr. T. Sebastian Davis, which, however, would be very imperfectly understood without the paper, and the publication of which we accordingly reserve till next week.

A paper on *Microscopic Photography*, by Mr. Edward Viles, was then read by Captain Abney.

The Chairman said that the paper was one of great interest, and while they were sorry that Mr. Viles had not been able to be present with them on that occasion, it would give them great pleasure to have him with them at their next meeting, at which he would exhibit his negatives and enter more fully into details.

Captain Abney observed, for the benefit of any member who desired to practise microphotography, and who had got object glasses which were not quite achromatic, that all difficulty would be obviated by using a monochromatic light.

Mr. Dallmeyer (regretting the absence of Mr. Viles) said that he had in his possession numerous microphotographs, many of which had entirely faded. To Mr. Viles was due the credit of having produced not only the largest picture of that class that he had seen, but one produced in unchangeable pigments; while with regard to quality the one for which he had been awarded the medal was superior to any he (Mr. Dallmeyer) had ever seen. In illustration of the importance of microphotography he might state that Colonel Woodward, of America, had photographed things which, owing to the physical constitution of light, could not be seen. The chemical ray would show closer separations of lines than the human eye was capable of distinguishing.

Mr. Edwin Cocking then read a paper entitled *Thoughts on the Recent Exhibition.*

No discussion followed.

The Chairman announced that the next was the annual meeting of the Society, for the election of officers, &c.

Mr. R. Kennett exhibited a choice collection of negatives by the gelatino-pellicle process.

Mr. Harman made some observations on his estimation of the advantages of the wet over the dry process.

Mr. J. L. Lane exhibited a new camera embodying a reversing back, as described by us a few weeks since, the double back being remarkable for its simplicity of construction.

After a vote of thanks to all who had contributed to the interest of the evening, the proceedings terminated.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The meeting of this Society, which was held on Thursday, the 3rd inst., was devoted to a magic lantern entertainment. Mr. Frank Howard presided, and the large room in the House of the Society of Arts was well filled. Keevill's lantern, under the direction of Mr. F. York, was the medium by which numerous fine pictures by Messrs. York, England, Woodbury, Dunmore, the Chairman, and others were thrown upon the screen. Upon these we purpose making some critical remarks next week. Mr. W. M. Ayres exhibited, on behalf of Mr. Baker, a curious mechanical lantern slide designated "Beale's choreutoscope," the object of which was to produce lifelike motions of figures upon the screen.

The proceedings were varied by the reading of the tale of "Gabriel Grubb," by Mr. Statham, Jun., and Dr. Croft's poem of "Jane Conquest," by a young lady.

The meeting proved a very successful and agreeable one.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

The Board of Management of the above Association held its monthly meeting on Wednesday, the 2nd inst., at 160a, Aldersgate-street, E.C.

The following gentlemen, having been proposed by Mr. Lavender and seconded by Mr. Hall, were elected members of the Association:—Messrs. Staples, Pember, Howard, and Hackett.

The balance sheet and Secretary's report for 1877 were approved. The board then prepared the report for the annual meeting, but, owing to the number of members present being insufficient to constitute a general meeting, it was postponed till February 6th, at 8 p.m. The members are particularly requested to note the date, to be present on that occasion, and to invite friends to further the object of the meeting by their presence.

Correspondence.

Intensification of the Weaker Portions of Negatives.—Tcha-Oma, a New Retouching Medium.—Death of M. Braun, of Dornach.—Emulsion Negatives by M. Balaguy.—M. Gobert's Process of Photolithography.

The usual monthly meeting of the Photographic Society of France was held on Friday last, the 4th instant. M. Davanne occupied the chair in the absence of M. Peligot, the President, who was indisposed, so that it would seem that the two societies of England and France are entitled to sympathy for being both deprived of their able presidents—let us hope but for a short time.

M. Girond was unanimously elected a member of the Society. M. Pector, in the absence of M. Perrot de Chaumeux, detained in the provinces by the general communal elections, read the extracts from the foreign journals, among which were the remarks at the Berlin Society's meeting upon the advantage of rubbing powdered lead upon the parts of a negative under-exposed.

Mr. Stebbing said that in his experience the application of a stump with red powder on those parts of a negative feebly visible was very efficacious, and made half-tints appear which otherwise would be scarcely apparent.

M. Davanne added, with respect to redeveloping, that if they intensified the feeble parts with pyro. and silver, they rendered other parts more vigorous also, so that in obtaining printing force in the feeble parts of a *cliché* they made the remaining portions too intense, and hence produced hardness.

M. Gobert preferred a film of bichromate on the negative, and, after a short exposure, applying, with artistic judgment, the brush charged with graphite.

M. Alfred Chardon said that in the emulsion processes (and wet collodion had a certain analogy) intensification did not really create any image—the silver deposited only gave more force to what there was, but did not make anything new. If the original exposure did not—as it should—give a harmonious picture, intensification on local parts could not make a perfect whole.

M. Carette submitted to the Society a new product which he calls "tcha-oma"—a Japanese paste to replace gum arabic as the material of the retouching surface of negatives. The instructions for its use were as follow:—Boil 1000 cubic centimetres of water in a porcelain or varnished earthenware pan, and plunge the stick of paste into it as soon as the water commences to boil, then stir with a wooden spoon until completely dissolved. Now remove the pan from the fire, and filter into a bottle. The solution must be cold when used. Keep the bottle well corked. As soon as the negative is taken, and while still wet, pour upon it the above solution, so as to produce an even film. Allow it to dry naturally upon a grooved draining-stand, so that the excess may drain off at one corner of the plate. In the event of the negative from any cause becoming dry before pouring on the solution of tcha-oma, the plate must again be made wet and the rest of the operation performed as above stated, and it will answer as perfectly as if poured on before the negative was dry, which is not possible when gum or dextrine has to be used. This new product he (M. Carette) said would supersede the use of varnish for retouching purposes. In a word, tcha-oma gave the best surface for retouching, cost the least, united all the good qualities desirable for facilitating the production of good work and preserving the varnish of negatives, and had the double advantage of equally permitting the use of the point, needle and pencil without fear of injury. It was impossible to desire better *materiél.*

The order of the day announced the presentation of photographic proofs, in printing ink, by M. Braun, of Dornach.

The Chairman was very sorry to have to state that M. Braun died on the 31st ult. They had thus lost the man who first popularised Swan's carbon process in France, and whose name would be for ever honoured by the publication of his unrivalled collection of reproductions, after the old masters, from every celebrated gallery in Europe—a labour of love to M. Braun, who was himself an artist. His wonderful grouping of flowers for the textile fabrics of Dornach and Alsace, and his enlarged photographs of very considerable dimensions, would not be easily forgotten by those who had the good fortune to see them in the Exposition Universelle, held in the Palais de l'Industrie, in the Champs Elysées, Paris, in 1855, and which, for beauty of the lines and harmony of the conception and design, have never since been equalled, much less surpassed.

M. Mouilleron exhibited a magnificent portfolio of reproductions from the old masters in the Museum of Munich, by Hafenstangl, printed on albumenised paper in silver. The prints were much admired. They at once gave the impression of being faithful representations of old paintings.

The competition established by the Society, under the patronage and with the pecuniary aid of the Minister of Public Instruction, for the best photographic camera and complete equipment for use for official missions and travellers in foreign countries, has been responded to by four competitors. A representative commission of travellers and photographers was named, consisting of MM. Clouzan, Derogy (optician) Ferrier, Franck de Villecholle, Haincque de St. Senoch, de la Noë (commandant) and Janssens (de l'Institut), with M. Davanne, *ex officio*, as President of the Council.

The competition for a substitute for glass for emulsion and dry processes was postponed, there being only one competitor.

M. Balaguy exhibited two negatives, one being a view in the Forest of Fontainebleau, 14 × 10 inches, and the other a view in Auvergne, 9 × 7 inches, obtained by the collodio-bromide emulsion process. The larger one, sensitised with the usual solution, was excellent. The smaller one, which was sensitised with the same emulsion, but to which had been added a double proportion of alcohol, thus reducing the relative quantity of powdered emulsion, gave a much more sensitive film than the other and more transparent. Both negatives possessed equal effects as respects contrast; but, although the smaller negative was somewhat less vigorous it gave relatively as good a print as the other. There was no blurring even in the most trying parts. A backing of burnt sienna, mixed in dextrine and water, was used (according to the practice of M. Peuch for the last fifteen years), and wiped off with a sponge before commencing the development.

M. Chardon said he was pleased with the experiment, which showed that there was great latitude in the formulæ for emulsions.

M. Gobert observed that that was so much the better, there being a wide margin within which could be produced a very presentable image.

The Chairman laid upon the table a publication by Braun and Co., called *La Lumiere.* He then read the report of the committee on emulsions. [The substance of this was given in a previous communication, at pages 586 and 599 of last year's volume of this Journal.] He (the Chairman) gave the additional recommendation to colour the back of the plates to be exposed for landscapes and interiors with some non-actinic colour, to prevent blurring.

The Society thanked the commission for its labours, and reappointed it to continue its experiments, adding to its number the name of M. Alfred Chardon, in recognition of his talent. This was passed by acclamation.

A vote of thanks was passed to Captains Champenois and Rapatel for taking charge of the experimental boxes which had passed twice under the equator. A special vote of thanks was given to Captain Rapatel, a distinguished photographic amateur, for the exposures given to plates sent out to China by M. Audra, which were brought back to Paris and successfully developed. Thanks were also offered to M. Audra for his great kindness and services rendered to the commission.

M. Gobert (on being called upon by the Chairman) said that in the process of photolithography, which he had the honour to bring before his colleagues, there was nothing new under the head of photography, but there might be something new under the title of lithography, for by his method of working they could replace the lithographic stone by glass—a great advantage, for the present quarries were nearly all worked out, and would be entirely so at no distant period of time, while the materials for making glass were unlimited. Such was still the blissful state of ignorance amongst the mass of lithographic printers of the advantages that already might be secured by the aid of photography that one was really astonished at the slow spread of information; and he had made the otherwise really intelligent and clever lithographic printer attached to the Bank of France "jump out of his skin," when he (M. Gobert) proposed to substitute glass for the lithographic stone, as a support for the photographic image consisting of lines. That, he said, was impossible; and, looking at his (M. Gobert's) face, inquired:—"M. Gobert, are you ill to-day? or have you got your stomach so deranged that your mind is affected?" "Oh! no; not in the least. I was never more serious than at the present moment, as you shall see. I will myself print you a proof from a glass to convince you of the practicability of what I tell you; 'for seeing is believing, is it not?'" He then showed the printer a plate of patent glass about three-sixteenths of an inch thick, which he would call his child, and would caress it as such and wash it. Now, if he put water on the polished side, it would not run evenly, as if the glass were greasy, which was not the case. He would turn over the plate and pour water on the ground side, made rough by acids, and they would observe that the water would flow perfectly even, like collodion; that was, therefore, the side on which to pour a film of albumen, containing three per cent., by weight, of bichromate of potash, the whole being beaten up together and left to repose, then carefully drawn off without bubbles, froth, or residue. A pipette was now charged with the necessary quantity of the clear bichromated albumen, according to the size of the glass plate, and carried across the further top end. By inclining the glass, the albumen was spread with the pipette lengthwise towards the operator, and the excess drained from the nearer corner. The glass, they saw, was sustained in his hand by the aid of an English pneumatic holder, having a hook at its lower end. Now he would turn the glass upside down, and suspend it by the hook of the holder to one of a series of wires hanging from the ceiling of the work room, which would enable him to rotate the glass to secure an even surface of the albumen, and to render the film as thin as possible. They would observe by the increased rotation that he caused the albumen in excess to be projected from the edges of the plate in drops; he also avoided dust by the reversal of the glass, which all albumen workers knew must be avoided. He then detached the glass from the holder, and in the course of a minute or two dried it over a gas-heated metal plate, when it was ready for exposure. The exposure varied with the amount of light, from one to ten minutes in diffused light. The plate he had experimented with had had ten minutes' exposure. That, he said, was enough; the image would be apparent then without any after-exposure or other nonsense. He would now begin to make the "black table," and ink over with common lithographic or transfer ink the whole of the albumenised surface of his "child," and thus thoroughly blacken her face, as they saw, to their great amazement—*ne'st ce pas?* Well! let them pass the inking-roller once more, as it would repay them for the trouble. Now to wash the face of his "darling!" He would place it in a tray of clean cold water for a bath! At the very instant of contact—in the twinkling of an eye—it was clean. Eureka! "By Jove!" exclaimed the lithographic printer, "there's my image already inked! Really I must ask your pardon, M. Gobert; for you neither suffered from illness nor indigestion, as I imagined, and, as you justly said, 'seeing's believing.'" Yes, he might rub it with his finger, but it would not move—the insolubility was too strong for that. He might, without sponging, print off the first proofs, and then in the usual manner print two hundred copies that day and two hundred the next day. He (M. Gobert) said he had not himself printed more than two hundred from one glass, but did not know how many more might be pulled off through the press; for as yet he perceived no loss of sharpness nor softening of the film from water or from wear or tear. So long as they kept off acids or vinegar, which would carry off the inked image and film altogether, he did not yet see any danger. If the first inking should not prove sufficient the image might be strengthened afterwards and copper plates obtained therefrom.

The demonstration, of which the above is a description, was so striking and so successfully performed that it was received by the members with well-merited acclamation. W. Harrison.

Asnières (Seine), Paris.

JOHNSON'S NEW CARBON PATENT.

To the Editors.

Gentlemen,—Having read the letter of Mr. Miller, in your last number, and the article to which he refers, I have no hesitation in saying that my claim to the use of spirit in transferring negatives, made in my recent patent, is an erroneous one, and that I shall take an early opportunity of doing that which the law provides for when such a mistake has occurred.

I am surprised to see in the letter of any respectable man the vulgar imputations made by Mr. Miller. He ought to know that no person can be possibly injured by a patent being taken out for a published process but the patentee himself, who not only thereby records his ignorance of the subject upon which he presumes to teach others, but throws away his money wholly or in part into the bargain. Even a disclaimer cannot be made except at considerable cost.

I am only pleased, as an excuse for my ignorance, that I was in a foreign country, had not the English journals to refer to when I took out the patent, and that my agent here does not appear to have made the usual search.—I am, yours, &c., J. R. Johnson.

January 8, 1878.

FRILLING.

To the Editors.

Gentlemen,—In your number for December 28th is an article on *The Gelatine Emulsion Process*, by Mr. Thomas Chilton, in which he says:—"The frilling of the film has been, and is still, my greatest difficulty, and is one which has been experienced by most gelatine workers; but I am glad to know there are some who say it is a thing of the past." Having experienced the same difficulty myself, allow me to say a few words on the subject.

In the autumn of 1874 I took with me, on a photographic tour into Somersetshire, a few dozen of gelatine plates. The emulsion was from Kennett's dried pellicle. The locality was the town of Dunster, in the neighbourhood of which is some very beautiful scenery. I was in hopes I should have been able to return home with a few good specimens of that scenery; but you may easily imagine my disappointment when, after a journey of some three hundred miles, I was scarcely able to save a single plate, all being more or less puckered or frilled. I was at a loss at the time to know the cause.

In the year 1876 I thought I had discovered the cause of my failure, and, therefore, determined to try again. I had some of the plates left which I had prepared in 1874, and I had also some of the pellicle left, with which I prepared a few more plates. The town of Dunster is supplied with water from the surrounding hills. Now this water is as soft, or nearly so, as rain water. Taking this into consideration I felt convinced that the softness of the water was the cause of my failure. What I had to do, therefore, was to get hard water. Now, although the water from the hills is soft, the water from the wells sunk in the town is hard. I therefore made use of the hard water both for the developing solutions and for soaking and washing the plates. The result was perfectly satisfactory—not the sign of a frill. In washing one of the plates I poured on it by mistake some soft water, and the consequence was that it frilled immediately.

It appears, therefore, that to ensure success hard water must be used, and the harder the better. This will explain why some have succeeded, while others have entirely failed. Those who live in places where the water is hard meet with no difficulty in the development of gelatine plates; while others who have nothing but soft water, or something approaching to it, meet with nothing but disappointment.—I am, yours, &c., George Lawrence Burge.

Barton-on-Humber, January 7, 1878.

To the Editors.

Gentlemen,—Mr. Chilton seems to despair of getting a gelatine film that will not frill; but with some films, I can assure him, "it is a thing of the past."

The last two years I have worked Kennett's gelatine plates, and I have not had one frill or slip. Small blisters come up sometimes, but they go down again on drying.

As an amateur of short standing I have worked these plates with the greatest facility. Of course in my ignorance I have over-exposed and under-exposed.

I have written this to show that there is a remedy for the evils of which Mr. Chilton complains, although I am sorry to say I cannot assist in the matter.—I am, yours, &c., W Adkins.

268, *Oxford-street, London, W., January* 8, 1878.

DOUBLE-COATED CARBON TISSUE.

To the Editors.

Gentlemen,—Whenever any ingenious gentleman who has dabbled a little in pigmented printing wishes to bring his name before your readers the first thing that suggests itself to him is to have a fling at the Autotype Company.

Mr. G. S. Penny does us the honour this week. He informs your readers that he "broached" an idea in March, 1871, this idea being the production of a tissue with two coatings. Now, considering that a sheet of paper can be coated once with gelatine and pigment, it does not seem to us an extraordinary flight of imagination to "broach the idea" of a second coating, or in fact as many more as may be required.

Mr. Penny may have made his wants known to the Company in 1871; however that may be, he certainly has not applied lately for double-coated tissue. He seems to be strangely in ignorance as to what is or has been done. Double-coated tissue has been made for years. Four years ago a frame of *Liber* prints were contributed to the Photographic Exhibition by the Company, *labelled* as being made from double-coated tissue.

In an address upon *Pigmented Tissues*, delivered before the Photographic Society of Great Britain by Mr. J. R. Sawyer, the following remarks occur:—"Far from presenting difficulties, my decided opinion is that in pigmented tissues we have means of modifications and adaptations perfectly unknown to photography before. Not only have we colour—that is to say, the power of using almost any pigment that may be desired—but we have the means of combining pigments, and of getting effects that are impossible in any other way. Take, for instance, Turner's *Liber*. It is well known that the deepest portions of these are absolutely dug out of the plate with all the vigour of a master's hand. In the impressions—partly, no doubt, from the skill of the printer, but mainly from the boldness of these lines and touches—they appear almost black upon the sepia ground of the picture. An ordinary photograph would be totally inadequate to represent these—it would make the picture all one tint; but a judicious method of combining colour in the tissues, giving a coat of a suitable dark colour, then upon that imposing a layer of picture colour, enables us to render these dark touches with a fidelity rivalling the best original. The same principle holds good in many other cases. Given, for instance, landscapes: is it possible, I will not say to produce natural colours, but to produce a harmonious and artistically-tinted photograph simply by the superposition of colours over each other." Double-coated tissues are not, therefore, the novelty supposed, and if they have not been supplied as articles of ordinary commerce it is simply because there has been no demand for them. As a rule, our clients find the difficulties of single-coated tissue sufficient for them.

But to have a *proper* fling at the Autotype Company it is always necessary to write in an offensive style; so Mr. Penny talks about our "dog-in-the-manger" policy. Mr. Penny is not, perhaps, aware that we have no monopoly in tissue making—that we granted months since to Messrs. Marion and Co. full right to manufacture tissue quite independently of ourselves, and duly advertised this fact in the journals of July, 1877. Mr. Penny will note that we ourselves provided the very competition he so much desires. He avers that we "will not," and other makers "*cannot*," advance; but if they are *makers* at all why cannot they advance? If they make tissue at all, why cannot they coat it twice as well as once? This reasoning is unintelligible to us. And to what does Mr. Penny's letter amount?

In 1871 he "broached an idea"—that his suggested improvement has been lying dormant, and that the Company pursues a "dog-in-the-manger-like policy." We reply: double-coated tissue was known long before his idea was broached; that it has been made and used extensively for certain work; that had it been demanded by any of our licensees it would have been supplied; and that when Mr. Penny runs into offensive phrases he draws on his imagination for his facts.

In concluding permit us an allusion to a letter in the same number o your Journal from Mr. W. S. Miller, who imagines that we had some hand in the "concocting" of Mr. J. R. Johnson's new patent. We have only to say that we have no interest in Mr. Johnson's patent; that our first acquaintance with it was through the printed specification; and that the ingenious and experienced gentleman referred to needs no assistance in the "concoction" of a patent from—Yours, &c.,

January 8, 1878. The Autotype Company.

Obituary.—The death is announced at Dornach, Alsace, of M. Adolphe Braun, the head of the celebrated photographic establishment which first applied photography to the reproduction on a large scale of the masterpieces of Michael Angelo and Raphael.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

About five dozen lantern slides will be exchanged for anything useful in photography.—Address, N. MAY, 16, Chestnut-walk, Worcester.

I will exchange a Harrison's head-rest for albumenised paper or chloride of gold.—Address, S. ARLIDGE, photographer, Northampton.

Wanted to exchange, three dozen coloured lantern slides—Scripture subjects by Carpenter and Wesley—for anything useful in photography.—Address, F. SHAW, Willowby-street, New Lenton, Nottingham.

Wanted to exchange, a $3\frac{1}{4} \times 4\frac{1}{4}$ bellows-body, rising-front, and folding tail-board camera, with three double backs, new, for a wide-angle lens.—Address, J. SCHOFIELD, Heaton Mersey, near Manchester.

A quarter-plate camera and lens, glass bath, tripod stand, and frame for dark tent will be given in exchange for a watch or magic lantern and slides.—Address, R. W. YOUNG, 3, Stoke Hills, Ipswich, Suffolk.

Wanted, in exchange for a large cylinder electrical machine, cylinder about 15×10 inches, and a stereoscopic camera with lens, changing-box, &c., a water-tight bath, or anything useful in photography. — Address, F. CROSLAND, 55, Bold-street, Liverpool.

ANSWERS TO CORRESPONDENTS.

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

NOTICE.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

REGISTRATIONS.—In our next.

LUX.—Try the proportions of six ounces of hyposulphite of soda to a pint of water.

H. G. BOX.—Thanks for the cutting, but we have already taken notice of the photographic feat therein recorded.

A THEORISER.—We must refer you back to page 579 of our last volume (December 7, 1877), where you will find a detailed account of the trinoptric lantern of Canon Beechey.

A PHOTOGRAPHER (Manchester).—We regret to find photographers resorting to such practices, but sooner or later they must recoil upon the heads of those who indulge in them.

S. G. F.—Of the various lenses in your list that marked A will prove most useful, inasmuch as it possesses all the properties of the others, together with other features peculiarly its own.

R. S. P.—From your description it appears probable that too great a proportion of carbolic acid has been added to the gelatine solution. Bear in mind that *very* little suffices to prevent decomposition.

BETA.—Your letter having been wrongly addressed has only been delivered by accident. The only advice we can offer is to precipitate the gold from the solution by means of protosulphate of iron.

R. O. P. (Dalston).—The red discolouration on the plate is owing to the presence of nitrate of silver in the film. The preventive consists in giving the plate a *thorough* washing before applying the tannin.

T. O. G.—Try the following to prevent the film from splitting after drying:—As soon as the negative has been fixed and washed pour over it a little weak gum water, after which dry and varnish. Diluted albumen may be employed instead of gum water.

OBLIGED READER.—You may prepare the varnish by dissolving twelve ounces of sandarac in a quart of strong methylated spirits of wine. Place in this about a quarter of an ounce of camphor and a quantity (say half a pound) of coarsely-crushed glass.

LIVERPOOL.—No special strength of chloride of copper is necessary for intensification; let it be such as to produce the required effect in half-a-minute. This will whiten the image, which must then be well washed, and afterwards flooded with the ordinary alkaline developer.

T. F. F.—Your letter was duly received, but up to the time of going to press we have not received the photograph, nor, indeed, have we heard of it. Possibly you may have omitted sending it, but until it is received we cannot offer any opinion as to the nature or cause of the defects to which you allude.

ALFRED S.—When we first saw your prints we concluded that water had been used in which were suspended particles of dirt; but upon subjecting the specks to microscopic examination we have dismissed this idea. It is possible that the employment of a different sample of collodion for facing the prints would give a better result, especially if it had a better and tougher body. Are you certain that the plates were made thoroughly clean previous to applying the collodion?

GEO. SMITH.—Yes; the preparation of plates in the light is far from being the impossible thing you imagine. Try the following:—After collodionising and sensitising remove the plates from the bath in daylight, give them a thorough washing, and then place them aside to dry. Then, in a dark room, immerse them in a solution of tannin for a few minutes and dry them. They will be found to answer as well as if the whole preparation had been conducted in a dark room.

DR. MANTELL.—The preservative may be applied either by immersion in a bath or by pouring a little on at one edge and allowing it to flow over the surface. The plate thus treated may be dried, either spontaneously or by heat. The development may be conducted by either the alkaline or acid pyro. process. For lantern transparencies the latter seems the better method. Previous to the application of the developer rinse the surface of the plate with water.

J. WILLIAMS.—It is of no use to attempt taking landscapes, or any other kind of photographs, with the back lens of a portrait combination; for under no circumstances whatever would you succeed in obtaining presentable pictures by such means. The *front* lens of the combination will, however, answer the purpose quite well if placed flat side to the scene with a diaphragm a little distance outside of it. What we have said respecting the non-suitability of the back lens must be held to apply to portrait lenses of the original Petzval form.

J. E. G.—A few days ago we saw at Mr. Solomon's, Red Lion-square, a kind of transparent muslin that would prove to be the very thing you want. It differs from the ordinary non-actinic muslin, formerly manufactured by Mr. Solomon, in being of a deep ruby-orange colour. A piece about a foot square would admit sufficient light to enable you to operate with ease in such good light as you will have in India. In reply to your last query: the quantity of light admitted is of no consequence so long as it is non-actinic. The idea of the developing sink with a glass bottom and a reflector placed underneath is excellent.

PHOTO-CHEMICUS.—We recollect, several years ago, placing upon record the results of an experiment somewhat analagous to yours. Some iodide of silver having been wanted, it was prepared by means of iodide of potassium and nitrate of silver; the precipitate was then well washed with several changes of distilled water, and allowed to settle. The bottle containing the iodide of silver having been placed in the light, the supernatant water, in the course of a few hours, became of a brown colour, evidently from the liberation of iodine; but this became absorbed upon allowing the bottle to stand in the dark for a short time.

M. H.—The method we advise for placing the diaphragm is to remove it the greatest possible distance from the lens of which the mounting will admit; then try the effect in the camera, using the *smallest* stop. What we here mean by "effect" is this:—See if the ground glass is so equally illuminated that a plate of the dimensions you purpose using is thoroughly illuminated from corner to corner. If the corners be dark owing to the area of illumination being circumscribed, push in the stop towards the lens until that area is extended so as to illuminate the plate. As a rule, the greater the distance at which the diaphragm is placed from the lens the flatter will be the field of definition when using a large stop. This rule would not apply in the case of a very deep meniscus, but it will, we believe, in that of your lens.

RECEIVED.—W. Washam and J. Schofield. In our next.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2. York Street, Covent Garden, London, W.C.**

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

For the Week ending January 9, 1878.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Dec.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
3	30·30	SW	46	47	50	45	Dull
4	29·91	SW	47	48	48	45	Raining
5	30·19	E	43	44	47	42	Dull
7	29·61	W	38	40	45	37	Fine
8	29·75	NE	37	38	43	35	Cloudy
9	30·18	NE	35	37	—	33	Cloudy

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 924. Vol. XXV.—JANUARY 18, 1878.

THE ACTION OF CERTAIN BROMIDES AND CHLORIDES ON EMULSIONS.

In pursuing this subject we have now to consider a different action of the haloid salts, or more correctly, perhaps, a similar action exercised in the removal of a different class of fog. In our experiments last week the emulsion was fogged by the protracted action of free silver, and we have now to speak of one in which the same effect is produced by means of light. In the corresponding experiments made some months ago we carried the fogging to such a point, by several hours' exposure to strong light, that it became a difficult matter to restore the working properties of the emulsion. In our present experiments we exposed the emulsion to diffused light with continual shaking until, upon trial, it gave only a slight trace of an image upon development. To those of our readers who may not have tried the experiment, it will be a matter of surprise the length of time an emulsion must be exposed to light before it shows any distinctly-marked traces of fog; in the case in question between four and five hours were required, the emulsion standing exposed upon the table in a well-lighted room and about two yards distant from the window.

It is needless to recapitulate the results of the whole course of experiments; it will suffice to say that the bromides and chlorides of copper and zinc acted most vigorously in clearing away the fog, the end being attained in less than an hour. Bromide of cadmium and the chlorides of cobalt and gold required between two and a-half and five hours, bromide of potassium about seven, and bromide of ammonium longer still. In the last case, it may be remarked, the emulsion did not regain its working properties very much more rapidly than if it had been left to itself; twenty-four hours after sunning a portion which had been stored away in the dark had become spontaneously almost free from fog. The emulsion employed was a washed one, but after "sunning" and treatment with bromide or chloride the films were washed to remove the soluble haloid, and dried without preservative.

Whatever may be the reactions which occur in the formation of the invisible image by exposure to light on the one hand, and the production of fog by excess of silver nitrate in the emulsion on the other, the ultimate effect, so far as the experiments of Captain Abney and others have gone, appears to be practically identical in each case. It is generally assumed that the change which occurs under the action of light depends upon the formation of a certain quantity of sub-bromide of silver by the liberation of a corresponding equivalent of bromine; and this theory sufficiently agrees with known facts to warrant us in accepting it as the correct one. When, however, we come to apply it to production of fog in an unexposed emulsion we meet with difficulties which are not at first sight explainable. Thus, if we assume the fog to arise from the formation of sub-bromide of silver by absorption of a portion of the metal of the free nitrate, we must have a corresponding liberation of nitric acid from that portion of the nitrate whose metal is absorbed. But nitric acid is one of the substances capable of preventing or retarding fog by its action on the sub-bromide of silver; why, then, should an emulsion containing sufficient nitric acid to decompose any sub-bromide which may be formed still exhibit fogging propensities? We shall attempt to explain.

First, we will suppose the case of an unwashed emulsion containing pure bromide of silver and free nitrate, and which has attained the fogging stage, presumably from the formation of silver sub-bromide. We will formulate it thus—

$$\underset{\text{2 eq. Silver Bromide + 1 eq. Silver Nitrate.}}{\overset{\text{Original emulsion.}}{2\ Ag\,Br + Ag\,NO_3}} = \underset{\text{1 eq. Silver Bromide + 1 eq. Silver Sub-bromide + 1 eq. Nitric Acid.}}{\overset{\text{Emulsion in fogging state.}}{Ag\,Br + Ag_2\,Br + NO_3}}$$

That is to say, the metal of the nitrate combines with an equivalent of the bromide and forms sub-bromide, setting at liberty the equivalent of nitric acid.

If we now add any of the usual salts employed in correcting foggy emulsions the action is tolerably plain. Let us take for example cupric bromide. The latter salt parts with half its bromine, which goes to the silver sub-bromide, reconverting a portion of it to the state of bromide; the copper salt does not, however, remain in the state of sub-haloid, for it is attacked by the free nitric acid and converted into nitrate, its halogen being liberated. This, then, combines with the remainder of the silver sub-bromide thus:—

$$\underset{\text{1 eq. Silver Bromide.}}{Ag\,Br} + \underset{\text{1 eq. Silver Sub-bromide.}}{Ag_2\,Br} + \underset{\text{1 eq. Nitric Acid.}}{NO_3} + \underset{\text{One-half eq. Cupric Bromide.}}{\frac{Cu\,Br_2}{2}}$$

$$= \underset{\text{2 eq. Silver Bromide.}}{2\ Ag\,Br} + \underset{\text{One-half eq. Silver Sub-bromide.}}{\frac{Ag_2\,Br}{2}} + \underset{\text{1 eq. Nitric Acid.}}{NO_3} + \underset{\text{One-half eq. Copper Sub-bromide.}}{\frac{Cu\,Br.}{2}}$$

Then, the free nitric acid reacting upon the copper sub-bromide, the formula is rearranged thus:—

$$= \underset{\text{3 eq. Silver Bromide.}}{3\ Ag\,Br} + \underset{\text{One-half eq. Cupric Nitrate.}}{\frac{Cu\ 2\ (NO_3}{2}}$$

The emulsion after correction thus contains only silver bromide and nitrate of copper. If a chloride be used for the purpose of clearing the emulsion the only difference would be the replacement of one equivalent of silver bromide in the above formula by one of silver chloride.

We may now consider the action of nitric acid, which, according to Captain Abney's experiments, is one of the products capable of destroying the image formed upon the sensitive film by the action of light. If, as it has been assumed, the effect of light and the action of free nitrate on the production of fog are identical forces, it might be reasonably calculated that nitric acid would prove effective in eliminating the latter; but such is not found to be the case. Free nitric acid—that is to say, nitric acid added to the emulsion over and above the quantity it may contain in the shape of silver nitrate—is capable of preventing fog in the presence of excess of silver for a considerable time, though not indefinitely; but its addition to an emulsion which has already reached the fogging stage is insufficient to clear it, except with the assistance of a soluble haloid. This would point to considerable difference between fog and exposure to light, yet we must not lose sight of the widely-different condition which exists between a thin dried film of sensitive material and a mass of the same in the state of emulsion; and it is very possible that extraneous circumstances intervene in the case of an emulsion to prevent the occurrence of a reaction which proves entirely successful with an exposed plate.

In attempting to trace the action of nitric acid in this direction we seem to be irresistibly driven to adopt Major Russell's opinion, published many years ago, that bromide of silver, except in the presence of a trace of soluble haloid, is photographically useless. It would appear that, in sensitising a bromised film or emulsion, as soon as the soluble haloid is fully converted the further action of silver nitrate tends to the formation of a compound (call it "sub-bromide" or what you will) of silver, which produces the effect of fogging, and that the function of nitric acid is merely to retard the formation of this substance; but when once formed it is powerless, *per se*, to reconvert it or to prevent fog upon development.

So far we have spoken of an unwashed emulsion containing free nitrate; but, if we change the conditions, a little clearer light is thrown upon the action of nitric acid. Let us take the case of a "washed" emulsion—washed or precipitated while in the foggy stage. We have then to deal with the bromide and sub-bromide of silver alone. The emulsion in this state is restored to working condition by certain salts (as bromide of copper) which are capable of acting directly upon the fogging material, whatever it may be; but others, such as bromide of ammonium, which do not possess the power of direct action, fail to produce any change. Nitric acid, acting upon the sub-bromide, may be supposed to abstract a portion of the silver, converting it into bromide and nitrate of the metal without removing the fog. If, however, one of the inert haloids (ammonium bromide or chloride, for instance) be present, the nitrate is at once converted into bromide or chloride and the emulsion brought into working condition.

In point of fact, nitric acid appears to act merely as a go-between; it is incapable in itself of forming any combination which will remove the fog, but it places the partially-reduced material *en rapport* with other substances which are also, *per se*, incapable of such action. This view may, we think, be extended to its action in removing or destroying the undeveloped image. Captain Abney's theory on the subject of this destruction is that it is due to oxidation, and from the experiments brought forward in its support we cannot doubt that oxidising influences do exercise a destructive action; still we are not prepared to accept that as the sole cause, or even as the actual one, under ordinary circumstances. In the case of the emulsion fogged by exposure to light, we can well understand how the atoms of the decomposed bromide rearrange themselves with omparative rapidity, the circumstances being eminently favourable to recombination. Nor is it difficult to imagine that when the change takes place in a dried film the dissociated atoms may remain for a very considerable time locked in the film but chemically separated, and incapable, from adverse conditions, of recombination. If we treat a film in this state with nitric acid the latter, we may suppose, acts upon the sub-bromide, and liberates the extra atom of silver, which at once recombine with the loose atom of bromine. It would be interesting to note the effect of the presence of moisture in destroying the image, all other influences being as far as possible removed. Obviously, if the theory of simple recombination of the elements be correct, the mere presence of moisture, which would favour combination, should hasten the disappearance or destruction of the developable image.

The practical conclusions we have arrived at, after a careful study of the facts connected with this subject, are—that fog, from whatever cause arising, is invariably capable of removal by suitable treatment; that, while certain of the haloid salts possess the power of acting directly upon the fogging material, others do not, but that in the presence of nitric and, probably, other acids the inert salts become active, hence the importance of an acid in the emulsion during sensitising; finally (and we speak with a due regard for the opinions of others), that free silver in emulsion—that is, a *real* excess after the total conversion of the soluble haloid—is a practical impossibility.

THE PHOTOGRAPHIC USES OF COAL GAS.

There are many practical applications of the heating and illuminating powers of coal gas to photographic use which might be extended considerably with advantage, and the apparatus in connection therewith greatly improved. At some future period it is our intention to enter fully into the subject of the possibilities of coal gas in the direction of heating rooms, but at present we merely allude to it. For some time past it has been seen that a first-rate and economical stove was a desideratum, and numerous have been the efforts to supply it, some of the later apparatus having special advantages and peculiar contrivances to increase the benefits derived from the heating; but we do not think we shall be contradicted when we state that a perfect stove is not yet made, and that a nearer approach to it than any hitherto brought before the public will yet be produced. At the same time there are already some most useful ones to be had, and under many conditions they are, for not over-large rooms, effective.

At the outset we must call attention to a very serious drawback to the use of gas in most towns. It is the great inefficiency of pressure in the day time—just that portion of the twenty-four hours in which we require its aid. This is brought about from motives of economy on the part of the gas companies. There is so small an amount of gas burnt that its profits do not cover that loss by leakage from the mains which occurs in the best-regulated gas works; and is a very serious item, reaching from five to twenty (and sometimes more) per cent. upon the total amount supplied to consumers; and this leakage increases in proportion to the pressure. The excuse usually offered by the company is that if the day pressure equalled the night the pressure upon every individual burner in use would be so great that complaints would be made of flaring and ultimately of too large a gas bill. To a certain extent this is right; but the opposite extreme is reached, and from the cause named, with the consequence of leaving our furnaces, our Bunsen's burners, even our gas lights where required, with a most insufficient supply.

This is a fertile source of disappointment in the use of the gas furnaces, now to be had so cheaply, for melting, reducing, enamelling, &c. One of them is bought, put into position, gas turned on and lighted in the proper way, and left for a while to grow hot. We return to it to find either the light blown down or the heat utterly inefficient, and are usually inclined to blame the furnace, if not return it upon the maker's hands. We have seen very many instances of this kind. We know at the present time a provincial laboratory of importance where the proprietor informs us he can never have more than two or three Bunsens burning at once, owing to the low pressure, notwithstanding his repeated complaints to the gas company's officials.

Again, too, in comparing results with these and other furnaces and burners, a considerable allowance has to be made for differences in the composition of the gas, some varieties (witness Scotch gases) being so much richer in carbon than others—a difference which tells strongly when questions of illuminating power are under considera-tion.

While dwelling upon furnaces we must not omit to mention another point often lost sight of—the larger the furnace or the greater the amount of consumption of gas required to keep it going the larger must be the supply pipe from the meter, as, if that be too small, no amount of day or night pressure of the usual description will suffice to keep the furnace properly alight. The india-rubber tubing used for connecting the furnace or burner to the supply pipe must be of good quality, thick, and without the usual spiral wire support running through it. If too thin the gas will find its way through and contaminate the air; and the same effect will be produced if the quality of the rubber be not good.

In the Bunsen burners, as usually sold, there is room for improvement. We recommend none to be used but those with the late J. J. Griffin's improvement in it. The air-holes in the base are covered by a ring of metal, having apertures to correspond; this arrangement enables the amount of air supplied to the burner to be regulated with the utmost nicety by turning round the ring and so covering more or less the base apertures. When the supply of air is much too great—or, in other words, the pressure of gas not strong enough—the flame will run down the tube and ignite at the gas jet inside, producing a flame all soot, and useless for any purpose. When the air is still in excess, but not to so great an extent, the gas burns with a penetrating, disagreeable odour most offensive to everyone in its vicinity. A perfect Bunsen flame should have a small, scarcely visible, white tip.

Attention has often been called to the usefulness of a wax match in developing, one being struck and then held under the negative undergoing development to warm any part deemed too weak or under-exposed. A very efficient substitute is a small jet on a foot attached by a thin india-rubber tube to a gas standard or supply-pipe.

There are some photographers who use a gas flame in the dark room in preference to daylight for developing and intensifying; and there is very much to be said in favour of the plan, as, comparatively speaking, the flame would be constant and uniform, and have a tendency to lead to the production of greater uniformity in the intensity of the negatives. Experienced operators well know the difficulty of judging with exactitude the right moment for arresting the action of the developer when their light has that fluctuating character so common to our climate. When gas is used special care must be taken to prevent the vapour of ether coming too near, or an explosion would soon result. True the vapour of ether is heavier than air, and has a tendency to fall; but beyond the action of specific gravity there is that power of diffusion which carries the heaviest vapours, if present in sufficient quantity, in all directions—upwards as well as downwards. Where the cost of suitable globes would stand in the way, we can suggest a very inexpensive mode of converting an ordinary glass shade into an "adiactinic" one. Let a small quantity of the *best* quality of Brunswick black be obtained from the drysalter and one or two coats laid on the globe. The result will be an excellent screen, through which no light will pass to injure the most sensitive emulsion or wet plate. The same liquid is an excellent material with which to coat the glass for dark room windows; it is cheap, efficient, and durable.

We had purposed making some remarks on recent inventions for producing powerful illumination by the aid of gas. They must now be left for future treatment.

By the kindness of Mr. W. S. Ashley Oakes we have been enabled to renew our acquaintance with some of the finest productions of the late Mr. Chas. Breese, who stood alone in his particular branch of photography. Mr. Oakes, who is an enthusiast in photography, has set himself the task of reviving the rapidly-waning interest in stereoscopic pictures, in which attempt he has our cordial good wishes for his success. In another column will be found the first of a series of articles in which he proposes to make public the hitherto "secret" methods, processes, and formulæ used by the late Mr. Breese in the production of his unequalled transparencies, and which Mr. Oakes purchased, together with the negatives, shortly before that gentleman's decease. Certainly, if any thing is calculated to once more bring into favour the now neglected stereoscope, it is the popularisation, if we may so term it, of a branch of our art hitherto undeveloped; and we greatly misjudge our amateur friends if a large section of them do not avail themselves of the information which Mr. Oakes generously proposes to place at their disposal. It is needless for us to enlarge upon the beauties of glass pictures or their immeasurable superiority over paper prints; but it is only in carefully studying a collection such as that presented to our notice by Mr. Oakes, that we are able to fully realise their value in connection with the stereoscope in rendering effects not otherwise attainable by any means. Be it ever so perfect, from a technical point of view, a photograph when examined without the aid of the stereoscope fails to convey a natural impression of the objects depicted; not alone from the absence of colour—for the same may be said of the majority of paintings—but from the impossibility of adequately representing "texture." Taking, for instance, a photograph of a lady in a robe of white silk or satin, who can say, from the majority of photographs, that her robe is not of homely linen? Or who, except by its surroundings, could distinguish an expanse of smooth water from the asphalte floor of a "skating rink?" In Breese's slides, as viewed in the stereoscope, the rendering of texture is perfect; the transparent brilliance of glass, the metallic glitter of polished silver, and the dead whiteness of Parian, are reproduced with a truth which no tricks of colour could equal, much less excel; whilst other substances lack but the suggestion of colour to render them perfect. In the department of combination printing, and in the production of atmospheric effects, Mr. Oakes has much to relate which will be new to most of our readers; and we can only repeat our hope that he may succeed in infusing new life into the practice of stereoscopic photography.

EMULSION EXPERIMENTS.

I HAVE read your leader on the subject which is akin to that on which I have been working lately, and am much interested in the results you have obtained; more particularly when I see that your results with the ammonium bromide and chloride coincide so exactly with what I should have theoretically expected, and that they also agree with my own experience.

In reference to your experiments, I wish to call your attention to a phenomenon that will result from the employment of nitric acid in the emulsion. Supposing we are preparing emulsion from zinc bromide and from copper bromide, we may have two effects produced. The zinc bromide is generally contaminated with zinc oxide, whilst the copper bromide, being very unstable, is almost always associated with copper sub-bromide (cuprous bromide). So unstable is the copper bromide, in fact, that I very much question whether a solution of it in alcohol will not specially decompose, forming bromal and the sub-bromide.

In some recent experiments I have had this reaction unpleasantly brought home to me, when boiling an alcoholic solution for a short time. Relying on Mr. Warnerke's experiments I anticipated that the bromal would give a precipitate when treated with silver nitrate; but, much to my astonishment, it did not do so. When the bromal was destroyed by nitric acid, in the presence of silver nitrate, a precipitate was at once obtained. From what I have seen lately, and from experiments I made some time back, the results of which were embodied in a paper on the albumen emulsion, I am convinced that there is an appreciable time elapsing before alcohol, when treated with bromine, is converted into bromal; and this coincides with your experiments.

Now, with regard to the emulsion made with the zinc and the copper bromide, the effect of the nitric acid would be somewhat different. In the one case we should have the formation of zinc nitrate and water; in the other we should have copper nitrate, water, and nitric oxide formed. *Nitric oxide destroys fog* as well as the other bodies I have experimented with; in fact, better than nitric acid. It will thus be apparent that, with such metallic compounds as those of copper, the elimination of fog may take place, perhaps, more easily than with those, such as zinc, which are dissolved with merely an evolution of hydrogen.

It has been asserted that nitric acid will destroy the image on iodide of silver; and it has been a difficulty to me to understand how I got results which differed from what other workers obtained. I find that the image has only been proved to be destroyed when strong nitric acid was employed, and when its application was of long duration. The reason of the destruction of the image in this case is now clear; for the nitric acid will act upon the organic matter in the film, and produce this very nitric oxide which I have shown can destroy it.

Apparently there are many agents which have the same destructive effect, and some of them may be worth following up. Let me say that it seems to me that the best way to destroy fog though exposure to light on a bromide plate is to treat it with a dilute solution of potassium bichromate or potassium permanganate. It is a safe way, and certainly does not affect the sensitiveness of the film. Take two grains to the ounce of the former salt, or half-a-grain of the latter, and immerse an exposed bromide plate in it for a couple of minutes, and wash. When dry it will be found to be ready for exposure in the camera, and to develope without any trace of fog. For a bromo-iodide plate a little chromic oxide may be substituted for the bichromate. I think the addition of the manganese salt to an emulsion will be found to be efficacious; in fact, the changes may be rung with these compounds pretty much as one likes.

W. de W. Abney, F.R.S.,
Capt. R.E.

[Since our leading article was written we have received the above communication, our remarks upon which we must hold over till next week.—Eds.]

ON THE PRODUCTION OF ENLARGED PHOTOGRAPHS OF MICROSCOPIC OBJECTS.

[A communication to the Photographic Society of Great Britain.]

The photograph of the *Proboscis of the Blowfly*, which is now before you, has the dimensions of 30 inches × 24 inches, and is, I believe, the largest microphotograph which has yet been produced. The difficulty of photographing this object is, doubtless, well enough known to several present.

First let me direct your attention to the fact that the photograph shows the object entire, as it appears when viewed under a power magnifying 200 diameters; or, rather, I should say, it is absolutely 40,000 times larger than the object is in reality, as may readily be shown by a pair of compasses and a rule. And, moreover, that the whole of the proboscis is under the eye, on a scale large enough to show all the details fairly well; but with a magnifying power of 200 diameters the whole of the proboscis cannot be seen at once in the microscope, for this power requires a quarter-inch objective—a lens with a limited field of view.

Wishing, however, to obtain a photograph showing the entire proboscis, and not a portion of it, I selected a microscopic object-glass whose angular aperture was sufficient to comprise the whole of the object within its field, and attempted to secure the enlargement direct by removing the sensitive plate to a great distance from the lens. Theoretically this should give all the amplification required; but in practice there was not only the difficulty of deficient illumination to contend with, but a limit was soon reached beyond which sufficiently sharp definition could not be obtained. The result of "straining" a lens is familiar to most photographers, and needs no further explanation. I may mention that in practice I have found eight feet to be the greatest possible distance which can intervene between the microscopic object and the sensitive plate, but it is much better not to exceed three or four feet.

But the image at that distance, where the definition began to break down, was far from being large enough for my desires; so I endeavoured to get rid of the difficulty by using an amplifying lens—analogous to an eyepiece. This gave all the magnifying power wanted, but, comparatively, the enlarged image was a mere blur. I was, therefore, under the necessity of reverting to the plan of making a small perfect negative, and afterwards enlarging it as much as the sharpness of the photograph would allow. The results are now before you.

By means of a $\frac{2}{3}$ O.G. a negative was taken on a quarter plate; this to the eye appeared beautifully sharp, and was an enlargement of twenty diameters.

A four inch O.G. (power about twelve diameters) was now screwed into the microscope, and a negative placed on the stage; as it was to be enlarged ten diameters it was necessary that it should bear this power. At a glance, however, it was seen that the sharpness was "nowhere," and that in spite of all the pains taken the negative was very much out of focus.

It was not until after many trials that a sufficiently sharp negative was obtained; but at length success crowned my efforts. Close examination will show that the large picture is not absolutely sharp; this is due not to any want of definition in the small negative, but to a cause which will be presently explained.

The enlargement was made by means of a solar camera fitted with a condensing lens of twenty inches diameter, and, therefore, commanding an immense power of light. As specimens of this method of enlargement these prints—absolutely untouched in every respect—will have an interest to photographers over and above that which may attach to them from a microscopical point of view.

Time will not allow me to describe the apparatus any further than to say that the sun's rays are made to fall continuously upon the condenser by means of a heliostat, which consists essentially of a mirror mounted on a polar axis in a manner similar to an equatorial telescope. As in the latter instrument clockwork keeps a star constantly in the centre of the field of view, so in the former clockwork serves to make the mirror turn from east to west with a velocity equal to the rate of the earth's rotation. By this means the negative is kept constantly illuminated by the condensed sunlight. The slight want of sharpness alluded to as existing in the print was due to a little irregularity in the motion of the clock—a defect which has now been completely rectified.

Should sufficient interest be felt in this subject I shall be happy, on a future occasion, to give a detailed description of the automatic solar camera, as well as an account of my working with it. At present I can only say that a piece of carbon tissue was pinned up to the focussing board, and, after an exposure of about half-an-hour, was developed and finished in the usual way.

As a matter of course the enlargement can be made by any other method which is found to give good results, though I do not imagine that as good a result is likely to be got by making an intermediate transparency. The solar camera method has the advantage of being a direct enlargement. Most now present know that while it is easy to make on glass a large satisfactory transparency from a small negative, it is most difficult to produce a correspondingly successful enlarged negative. This, however, by the way.

We come now to the important question of illumination. Except for the smallest degree of amplification I have not been successful with anything but sunlight. This is a matter of great regret, because microphotography is just such an occupation as one would like to follow on winter days, or evenings, when there is most spare time on hand.

Paradoxical as it may sound, better enlargements can be made of objects from an inch in diameter down to half-an-inch without a microscope at all than with one. Nothing more is needed than a good magic lantern, preferably fitted with lime or electric light. Care must be taken that the condensers are good ones. For the amplifying lens a small portrait combination, stereoscopic size or smaller, will answer best. It must be a lens giving a flat field, and must have no central stops. The microscopic slide, fitted into a frame, is pushed into the lantern in the ordinary way, the light adjusted as usual, particular care being taken to obtain a perfectly equally-illuminated disc. The focussing will require the closest attention, and is better done on a piece of cardboard than on the ground glass of the camera. Objects must be chosen that are moderately transparent and not of a non-actinic colour, as most entomological preparations are. If there is much opacity the concentrated lime light will not be found sufficiently powerful. With properly-selected specimens the exposures will be very short. Some otherwise intractable subjects can be managed by masking portions during the exposure. But when we come to really minute objects, and comparatively high powers are needed, the sun alone can produce a successful negative. In most cases the exposures are very rapid.

To use sunlight to advantage, a dark room, with one side exposed to the south, fitted with an adjustable mirror or a heliostat is requisite. The operator then sits, as it were, within his camera, and has all things immediately and easily under control. A condenser is necessary, and nothing answers the purpose better than the front lens of a portrait combination; the larger it is the better. Supposing now that we have a beam of sunlight entering the darkened room, and condensed by means of the lens above mentioned. If we place a sheet of white paper in a suitable position, and cause a microscopic object-glass to slide to and fro in the cone of light, we shall find that there is just one point, and only one, where we have a perfectly-illuminated disc of white light. This, then, is the position the lens ought to occupy in relation to the condenser. The microscopic slide must now be placed in the cone of rays at just the focal length of the enlarging lens. If too much light surrounds the object a higher power must be used; if, on the other hand, the whole of the object is not illuminated then recourse must be had to a lower power. From this it will be seen that the solar microscope—for, in effect, any apparatus for producing microphotographs is nothing more—requires to be managed in a manner different from that which the ordinary table microscope requires. With the latter the slide is placed on the immovable stage and the objective moved nearer or farther till vision is distinct. In the latter it is the object-glass which is fixed in its proper position and the stage made to move. Between the condenser and the amplifier there is a certain relation which must always be observed; there is no better way of discovering it than by moving the amplifier to and fro along the optical axis of the condensing lens.

As a rule little trouble will be found arising from the heat of the concentrated solar rays. Of course, if an object remained long near the burning point of the condenser it would be damaged, but during focussing it is more agreeable to diminish the light by slipping an annular diaphragm over the condenser; sufficient light will be left for focussing by, without any fear of damage by heat. During the brief period of exposure it is necessary to avail oneself of the full power of the light.

The importance of using a condensing lens of the kind described cannot be over-estimated. Strange to say, the use of it completely gets rid of diffraction, while the exposures are reduced amazingly, thus rendering it easy to photograph animalculæ in motion. To avoid diffraction some writers have recommended the interposition of a piece of ground glass; this does not answer so well as the condenser, and has, moreover, the effect of immensely increasing the time requisite for the exposure. It also exercises a detrimental effect upon the definition.

I am now engaged in fitting up a dark room for microscopic photography and like uses. I shall be happy to furnish full particulars of it if desired.

The negatives from which the present enlargements were produced were made by sunlight. A brass bar, with a rack on the top of it, carries various brass holders; one of these contains the condensing apparatus, the other is a stage, and another is the holder for the object-glass. A connection is made from this last to a 5×4 camera, by means of a cone of leather bellows; the entire apparatus rests in a mahogany box composed of the bottom and one side only. This box is screwed on to the bar of an equatorial stand, where the telescope is generally. The object of this arrangement is that one movement of the Hooke's joint keeps the condenser pointed to the sun. The exposures were practically instantaneous, and while they were made of course the handle was not turned. By this means reflection from mirrors is done away with, which is an advantage.

A good magic lantern is valuable for the exhibition of microphotographs; but instead of making the negative by the ordinary wet process, use a bromide emulsion instead. After development pour over the plate strong nitric acid; a transparency, instead of a negative, is then produced, and as this is done at one operation there is a manifest superiority in point of sharpness over those which are produced by printing from a negative, as is generally done. Full working details of the production of these transparencies will be found in an article which I contributed to the *Year Book* for 1877.

Considering the importance of recording what is seen by the aid of the microscope, and bearing in mind the facility with which the generality of objects can be photographed, it seems a matter of surprise and regret that there are so few workers in this field. It is an easy matter to adapt a camera to a microscope, and plates can be purchased all ready for exposure, leaving nothing but the development and fixing to be attended to. Under these circumstances a great number of microphotographs ought to be produced; for though as representations of what is actually seen there may be some shortcomings, yet they are better than nothing, while the drawing of microscopic objects on paper is a proceeding so difficult and so tedious that we must not expect many observers to produce them, and then, if ever so perfectly finished, they could not compete in fidelity and usefulness with even a tolerable photograph which would be produced with a thousandth part of the labour.

With regard to the production of the negatives themselves, I have only to say that they were made upon selected glass—flat, thin, and absolutely free from specks, blisters, and scratches—coated with a collodion giving a structureless film, sensitised in a normal silver bath, developed with iron, fixed with cyanide, and neither intensified nor varnished. Of course the utmost care was used to secure cleanliness in all the operations.

As to the microscopic objectives made use of, their only peculiarities are that they have an arrangement by which suitable stops can be inserted for the purpose of increasing the depth of definition, and that they are furnished with an extra lens—a double convex of suitable focus—which screws into the place usually occupied by the back stop. The purpose served by this extra lens is to bring the visual and actinic foci into coincidence. This arrangement is Mr. Wenham's, who recommended it many years ago. In my hands it has answered perfectly.

In conclusion: I have to express the hope that increased attention will be given to this fascinating branch of the photographic art, and that next year, if a medal is offered for microphotographs, that there will be a goodly number of competitors for it.

E. Viles.

THE PROGRESSIVE RESULTS OF THE PAST SESSION.

[A communication to the Edinburgh Photographic Society.]

Year by year the "progressive results" of each passing session is becoming more and more difficult to write; perhaps I ought to say it is becoming more and more easily written, as most certainly there is year by year less progress to record.

If it be true that charity ought to begin at home, it is equally true that any local progress that may have been made should be first noticed; and therefore I commence by reminding the members of the great measure of success that attended the exhibition held under the auspices of the Society twelve months ago. This, I think, we are fairly entitled to include under the items of progress, as many attempts at photographic exhibitions had previously been made in Edinburgh, but in no case had they been pecuniarily successful, or attained to anything approaching the magnitude or technical excellence of that of last year. As, however, I hope shortly to bring the history of the recent exhibition before the Society in another and more satisfactory form, I shall leave it for the present and pass to other, though probably less important, items of progress.

Those who think with me that perfection in photographic manipulation is to be looked for in an emulsion process, in which the bath with all its troubles is discarded, will recognise the contribution of Mr. Gray as one of considerable importance in that direction. It is no doubt true that for commercial reasons Mr. Gray keeps his process a secret; but we have abundant evidence that by it dry plates may be made much more sensitive than the ordinary wet collodion film, and that the image may be developed to full printing density without any tendency to fogging, although no bromide or other restraining agent is employed. But, although the process is kept secret, I am at liberty to say that the principle involved is the use of an organic body, which, by emulsifying a large excess of free silver, enables its accelerating influence to be brought into play without the ordinary drawbacks of fogging or the production of thin images.

Next in importance, perhaps, is the method of washing the emulsions by precipitation, introduced in the case of collodion by Mr. W. B. Bolton, and of gelatine by Mr. Wratten. By this means the operation is shortened and simplified; and, as washed emulsion is the direction in which perfection is to be looked for, this improvement is undoubtedly a step in the right path.

Taking the emulsion process as a whole, although, except in the points already indicated, no very marked improvements have been made there has been considerable light thrown on some of its more obscure phases, and the united results of many ardent experimentalists have swept away many difficulties and shown how some of its most objectionable qualities may be got rid of.

Carbon or pigment printing has, as usual, continued to make rapid progress—not so much in the direction of any new improvement as in the overcoming of prejudice and the increase in the number of those practising it; and I think it is a matter for congratulation that we have now in Scotland two houses which turn out for the trade work of the highest class. I mean Messrs. G. W. Wilson and Co., of Aberdeen, and Mr. Annan, of Glasgow. In this connection Mr. Johnson, whose name has long been connected with carbon printing, has patented some improvements, the principle of which is the getting of tissue the colouring matter of which varies, being denser, or in larger particles at the bottom and smaller towards the surface. Whether this is an improvement remains to be seen; but, doubtless, such tissue will soon be in the market, and carbon printers will not be slow to avail themselves of it should it be all that is claimed for it.

In addition to substantial improvements, there have, as usual, been claims advanced for some things that, to say the least, are of doubtful value. Foremost amongst those is the attempt of Sig. Scotellari to extract the "needful" from the pockets of photographers for his patent "*opturateur sensible;*" and I can only hope that Scotchmen, at least, will be too sensible to take the bait, as even fifteen shillings is too much to pay for a cardboard cap with a hole covered with a bit of violet-coloured paper.

Mr. Vanderweyde is one of those clever, restless people who are never content with things as they are, but must always be trying to improve them. His last venture may probably turn out to be his best. Be that as it may, he has undoubtedly shown how portrait work may be carried on with artificial light. By the electric light he brilliantly illuminates the interior of a white painted box, and passes the rays through an annular lens, such as is now used in lighthouses, and under such a light very fine portraits are said to have been produced in a few seconds. I hope by next meeting to have some specimens for exhibition, and the members may then judge for themselves as to their quality.

In connection with this matter I would throw out a hint which, if acted on, may be of advantage to all concerned. It is generally admitted that at present photography as a trade is very dull, and that a novelty of some kind is wanted to give it an impetus. Such a novelty may either be one by which, from its popularity and cheapness, sitters would be attracted to the studios throughout the country, or something that would revive the interest in photography by making it for a time, at least, the general subject of conversation. To the latter class the successful introduction of photography by night would certainly belong, and if properly worked could not fail to largely increase the ordinary business. The cost, however, of fitting up the necessary plant, involving as it does a powerful electro-magnetic machine and suitable gas or steam engine, is too great to be undertaken by a single individual, and as the benefit is likely to be felt by all it should be a joint-stock concern. I would suggest that the principal photographers in the city join together in securing a suitable suite of rooms in a central position, and fit up a studio with all the necessary appliances for the proper carrying out of Vanderweyde's system of night working. If properly advertised the novelty would produce an amount of enthusiasm that could not fail to largely increase the ordinary trade, while, *per se*, it would yield a handsome profit, which, of course, would be divided amongst the shareholders.

On the whole, although nothing very striking has occurred during 1877, photography has not only kept its ground, but has made considerable progress, especially in the artistic direction. Retouching—the bane of the profession in some previous years—is gradually giving place to the production of negatives so perfect as to need no such aid, the result being truer and better work, which, probably, after all, is the direction in which we must look for the permanent improvement of the trade. JOHN NICOL, Ph.D.

EXPERIENCES WITH DRY PLATES AND EMULSIONS.

[A communication to the Glasgow Photographic Association.]

WHEN our Secretary asked me to read a paper I was at a loss for a subject of sufficient interest to bring before your notice. After deliberation it seemed to me that every known process of any moment has been from time to time ably treated and thoroughly exhausted. However, on second consideration I thought it would not be out of place to give a brief retrospect of my own experience and experiments, and also their results in connection with dry plates by the bath processes in general and emulsions in particular. I cannot promise you anything original, and trust you will not be disappointed, for I can only offer you the following remarks with the laudable object of promoting investigation and experiments in a like direction, and producing discussion thereby.

I.—THE BATH PROCESSES.

My first experiments with dry plates were with the Fothergill process. In turn I have tried, with varied success, coffee, collodio-albumen, gum gallic, hot water, tea, and tannin. They all, with one exception, present in my hands an insurmountable difficulty, namely, want of rapidity—requiring, as they do, from seven to thirty times the exposure of wet plates. The exception referred to was the tannin process. To give you detailed formulæ of all the processes enumerated would be a sheer waste of time, as they may be seen in the photographic almanacs. I will simply give you my modification of Major Russell's tannin process, as the plates are reliable, and only require a little longer exposure than wet plates.

Collodion.—Add four grains of bromide of cadmium, one drop of distilled water, and half-a-grain of nitro-glucose to each ounce of ordinary negative collodion.

Silver Bath.—Eighty-five grains to the ounce, neutral; wash the plate well until greasy lines disappear, then flow over the following—

Preservative.—Tannic acid, ten grains; gum arabic, four grains; sugar candy, four grains; syrup of squills, two drops; water, one ounce; then set up to dry. These plates keep well for three weeks, but should be developed as soon after exposure as possible and by the alkaline method.

I may here give my process for cleaning, edging, and backing plates, applicable alike to all dry processes:—

For Cleaning.—Immerse the plates in a solution of bichromate of potash, one ounce; sulphuric acid, eight ounces; water, one gallon. Allow the plates to lie in this for several hours; wash under a tap thoroughly, and set on the draining rack to dry. When dry, dust over the marked side of the plate a little powdered talc, and polish off with a wash leather or piece of flannel. As an additional precaution against the film slipping an edging of india-rubber solution, a quarter of an inch round the margin, applied with a camel's-hair brush, may be used. In my experience I find that albumen as a substratum is next to useless. The developer permeates the film, and the ammonia used in it being a solvent of albumen the substratum is dissolved as a natural sequence.

Backing.—It is judicious in all cases to use a non-actinic backing, to absorb the light that passes through the sensitive film and prevent its being reflected from the back surface of the glass again on to the film, which would produce the kind of blurring known as "halation." The usual backing is burnt sienna mixed with mucilage and glycerine applied with a piece of rag to the back of the plate. A much neater and cleaner method, and which I prefer, is to coat the back of the plate with chrysoïdine matt varnish. In passing I would draw your attention to the advantages derived from the use of chrysoïdine varnish for dark room windows and globes. The most sensitive bromide plates can, I find, be manipulated without fear of fog in a light sufficient to permit everything to be freely seen, which is of very considerable importance.

II.—EMULSION PROCESSES.

The emulsion process is what I might term a more concise and scientific form of manipulation—doing away, as it does, with the silver bath and its attending disorders. This process has of late years made gigantic strides, which is mainly due to the energetic investigations of experimentalists—chiefly amateurs, who have always been the pioneers of improvements in photography. It seems to me, therefore, that we have every reason to believe that ere long we will have standard commercial emulsions quick, stable, and reliable, and I can unhesitatingly predict their universal adoption by the profession. I may also state that I am at present working out an emulsion process of which I have great anticipations. Should my efforts be ultimately crowned with success I will communicate full details at some future time.

My first experiments were with uranium dry plates, using Colonel Stuart Wortley's strong alkaline developer. They are very sensitive, particularly adapted for foliage and dark subjects, easy of development, but difficult to intensify.

The ordinary dry plates and washed emulsion issued by the Liverpool Dry-Plate Company are slow but sure, requiring from five to eight times longer exposure than wet plates. The extra-sensitive plates issued by the same Company I find require about double the exposure of wet plates, but are more difficult to develope and intensify than the ordinary plates.

My attention was next directed to the beautifully-delicate and sensitive gelatino-bromide emulsion. It is, without doubt, one of the most sensitive dry processes known. The colour of the film, being of an olive-green tint, is very deceptive. At first I had great difficulty with blisters, but overcame that trouble by using sulphate of magnesia in the washing water. Another difficulty is the frilling, which I have as yet only partially overcome by coating the plate with a one-grain solution of india-rubber in chloroform as a substratum. One of the drawbacks of this process is the length of time required for drying the film, which has been reduced to a great extent by the use of alcohol in making the pellicle.

One of the most simple and sure, although slow, of the emulsion processes I have tried is the formula published by Canon Beechey, to which I have but one objection—instability. If the plates are kept more than a week after being made they lose detail. I find them exquisitely adapted for lantern transparencies, without toning.

In experiments with Young's Philadelphia washed emulsion I find it much quicker, but in other respects similar, to the Liverpool emulsion.

During the past season I have chiefly experimented with Newton's American emulsion, which I considered, at first, to be the *ne plus ultra* of all emulsions I had tried. After keeping it for three or four months I found its sensitiveness gradually diminishing. The reason I ascribe for this, being an unwashed emulsion, is the excess of silver left in it undergoing a chemical decomposition, thereby deteriorating its sensitiveness. The preservative recommended for these plates, which I consider excellent, might be applied to other dry processes with advantage. It is as follows:—

Tincture of nux vomica	1 drachm.
Tincture of opium	1 ,,
Syrup of squills	1 ,,
Alcohol	2 ounces.
Water	10 ,,

Filter.

In my first attempts at portraits with this emulsion, used moist, I gave the same exposure as for wet collodion. On developing—using, of course, Newton's new sal soda developer—the image flashed out at once, and the plate immediately blackened all over. After repeated experiments I found that two-fifths of the exposure given to the first plate was quite sufficient. In comparative experiments with Newton's against other dry plates, using the ordinary alkaline developer, I find them even slower than the average of the other plates I have tried. On the other hand, in trying the sal soda developer with other plates I find it reduces their exposure about thirty per cent., and brings out the image clear, round, and strong, without the hard effect peculiar to dry-plate photography. In short, I consider it a great impetus to alkaline development; and it has placed a wonderful force in the hands of the photographer. While possessing all the good qualities inherent in the ordinary alkaline development, it possesses the additional advantages of iron development, viz., the continuous strengthening of the image which distinguishes iron from alkaline pyro.

The formulæ for the sal soda developer are as follow:—

Water	16 ounces.
Sal soda (washing soda)	2 ,,
Bromide of ammonium	40 grains.

Take the quantity of above that may be required to cover the plate (say an ounce), flow over the plate, return to the cup, and add four to six grains of pyrogallic acid. The image will appear and development go on as with a bath plate. If greater strength be required use more pyro. If the plate be under-exposed the energy of the developer can be greatly enhanced by adding, before the pyro. is put in, six drops of the following solution:—

Water	1 ounce.
Liquor ammonia	1 ,,
Bromide of ammonia	40 grains.

Wash thoroughly in clean water; intensify, if necessary, with acid silver and pyro. Fix with the following:—

Water	4 ounces.
Hyposulphite of soda	1 ounce.

The soda developer has a tendency to loosen the film, causing blisters when an edging of india-rubber only is used. To obviate this use a substratum of india-rubber over the plate.

Before concluding I would draw your attention to one of the many advantages collodio-bromide plates have over the usual wet plates, viz., that a transparency can be taken in the camera, direct from the sitter or other subject, at one operation, suitable either for the lantern or enlarging purposes. The following is the *modus operandi.* Take the negative and develope in the usual way by alkaline development; wash well, and pour off and on the following solution:—

Nitric acid	1 part,
Water	1 ,,

until the picture seems to bleach. Wash well, but gently, as the film is very tender after this powerful application. The result will be a thin transparency, which will acquire sufficient intensity by redeveloping in the usual manner.

Instead of occupying your time with any theoretical speculations as to the relative merits or demerits of the above processes, I prefer to give you a practical proof in the shape of negatives, transparencies from negatives, prints, and lantern transparencies, which I will show by means of the sciopticon. JAMES M'GHIE.

THEORY OF THE DESTRUCTION OF THE UNDEVELOPED PHOTOGRAPHIC IMAGE.

[A communication to the Photographic Society of Great Britain.]

IF I may be given permission, I will read a letter from myself, addressed to the *Journal* of the Society, as it was also to the other photographic periodicals, in which certain important additions were made to the paper I had the honour to read at our last meeting. I wish to obtain this permission, as I think that any matter which bears upon photography should, if possible, be brought before the members, that they may have an opportunity to discuss it, and also that the author or discoverer, whichever the case may be, may have an opportunity of explaining any difficulty which may seem to others to require it.

I am particularly anxious to hear any remarks that may be offered on this subject, as it seems to me that it affects the theories held in certain particulars.

The following is the letter:—

"I wish to make a few remarks on a subject kindred to that of my last paper which was read before the Photographic Society, and which appeared in your issue of last week. Since its reading I have undertaken further experiments with a view of ascertaining the cause of the fading away of the undeveloped image impressed on dry plates by long keeping after exposure. It will be quite evident that none of those agents that I previously used for eliminating fog or destroying the image could cause this gradual fading away. Reasoning from the fact that nitric acid was effective with silver bromide, it struck me that it might be possible to oxidise the loose atom of silver in the sub-bromide (Ag_2Br) and even in the sub-iodide (Ag_2I) of that metal, if the chemical theory of the photographic image held good. Films of pure silver iodide and of pure silver bromide, after exposure under proper conditions, were washed and treated with potassium bichromate, potassium permanganate, and chromic acid. With the first-named silver salt *all* were effective in destroying the image. With the latter silver salt the last two oxidising agents alone were effective, the permanganate requiring a longish application.

"Now if this destruction were caused by an oxidation of the silver atom, it should also be capable of being oxidised by ozone, since metallic silver when moistened can be per-oxidised by it. To test this plates were prepared, exposed, and left to the action of ozone, and in every case when proper precautions were taken the image was entirely destroyed. The oxidised films (however oxidised) were all capable of receiving fresh light images which could be developed free from fog.

"Is it too much, then, to assume that the effect of time on the image impressed on a dry plate is *to oxidise an atom of each of the molecules* forming the image; particularly when it is found that *nascent hydrogen* is capable of restoring it to a certain extent, though its perfection is marred by the reducing action of the hydrogen on the whole of the salt in the film?

"I wish, also, to note an experiment which I made some short time ago, and which struck me forcibly at the time. Two plates were prepared with rather thick emulsion, and exposed to a gas flame behind a negative for equal times; one was immediately developed and gave a good picture, whilst the other was put away in my dark room for a couple of months. On attempting to develope this latter, the image refused, apparently, to show at all; but on turning it over and looking through the glass an image was seen developing next to its surface. Eventually the image worked its way up to the top surface, and remained as an under-exposed picture. The atmospheric influences had evidently not had time to penetrate so far as the light, which latter must have been much enfeebled as it arrived at the back of the film; and hence on developing showed signs of under-exposure.

"Is it not probable that the keeping qualities of certain plates, when washed over with gallic acid, may be due to an oxygen absorber being present, which the atmosphere must first saturate before it can hope to attack the silver image? Apparently a preservative for a dry plate should be impervious to the air, and for double security it may be presumed it should contain some substance more readily oxidised than the atoms forming the image. I am keeping some plates in hydrogen and nitrogen, which, after a couple of months, will be developed in competition with some exposed to the air in the usual manner."

As an addendum to the above letter, I should like to make a few remarks. Firstly, the action of ozone is not confined to the destruction of the invisible photographic image alone; but it is also remarkably distinct in photographic prints. I have here a specimen of its action. The end of this toned silver print was kept dry, the middle portion *slightly* damped, and the other end saturated with water. I would have you specially remark the result. The damped portion is very much faded; the wet portion shows a decided loss; whilst the dry print is almost unaffected. Now we know that moistened silver is per-oxidised by ozone, but from what I can see by having tested a portion of it we have a distinct change, not in the metallic silver alone, but in the organic compound of silver forming the image. Now the print was as well washed as most prints are, and you will notice that in one spot, where a drop of sodium hyposulphite has been placed on the paper, we have a marked effect on the image, even where it was wet. I am not in a position at present to say definitely what has happened in the compound forming the image; but this I can say—that what will happen in ozone will generally happen by exposure to the atmosphere. In our climate, where we are exposed to so much damp, the very best state apparently for destroying the silver image is to be found.

My friend, Mr. Pearsall, in a conversation I had with him the other day, incidentally mentioned that in an old experiment made by Sir W. Grove, he found that the electric spark, when allowed to pass over the surface of a sensitive plate, did not cause any developable image where the spark had passed, that remaining a blank, but outside it developed. Mr. Pearsall was unaware of the experiments I was at that time carrying on, and it immediately struck me that the strongly-ozonised air, which would be in contact with the plate when the spark passed, would prevent the formation of an image, whilst beyond that space the light from the spark would be free to act. I may say that this oxidising action of ozone on the undeveloped photographic image opens out a great field of inquiry into coloured spectra, photography of the least refrangible end of the spectrum, and the reversal of the action of actinic light by the red rays. I also may say that in my succeeding researches on these points I have met with encouragement to proceed; and at some future date hope to lay the results before the Society. W. DE W. ABNEY, F.R.S., *Capt. R.E.*

COMBINATION PRINTING FOR THE STEREOSCOPE.

PART I.

[A communication to the Manchester Photographic Society.]

THE subject of which I am about to speak to you tonight is the one nearest to my heart, so far as photography is concerned. I am but an amateur; so I come before you with all due deference as far as my opinions are concerned. I feel how unworthily I have performed the task I set myself in writing this paper—a task I looked forward to with some pleasure and no little anxiety; for my object in doing this is a very ambitious one—no less, indeed, than a hearty desire on my part to awaken in the photographic world, and through it the world outside, a fresh interest in one branch of your business you have sadly neglected, and a branch that, not only in my opinion but in the opinion of many others, deserves a better fate at your hands. I cannot reasonably hope to accomplish this tonight, or even in many nights; but I am satisfied that the stone only requires to be set rolling down the hill and it will accomplish its own end.

I see by the announcement that I am down for a paper on *Transparencies.* As this may be somewhat misleading, I must first of all inform you that I am about to tell you what I know of *stereoscopic transparencies,* and more especially about Mr. Breese's work in this direction. I trust I shall not tire you by constant reference to that gentleman's name. But I look upon myself as occupying the same position with regard to him that Boswell did to Johnson, and I look upon Mr. Breese as occupying the same position as a photographer that Johnson did in literature; but if I can only be of as much service to his memory I shall be satisfied. Boswell, you know, was abused wholesale as a bore and a toady; but he bored and toadied to some purpose, for, thanks to him, we have one of the finest biographies that has ever been written.

At the risk of taking up a portion of the short time at my disposal this evening in telling you what most of you know, or should know, already, I propose to run over, as briskly as I can, a short description of the instrument I am about to deal with. In doing this I shall not mind making use of the language of others where I believe they have expressed themselves better than I could do. I have little scruple in going into details that may appear at first sight unnecessary; but I have found that most people, though rejecting with scorn the idea of their ignorance of the principle of the stereoscope, really know very little about the matter when asked to explain the principle in question—people, too, tolerably well informed on scientific matters generally.

When we look at an object a picture of that object is formed on the retina of each eye; but each picture, being observed from a different angle of view, differs to a slight extent, and the nearer the object is to the observer the more marked the difference is. If the right hand be held at right angles to the face and a few inches from the nose, the back of the hand will be seen by the right eye only, and the palm of the hand when viewed by the left eye, if you close each eye alternately. Hence the images formed on the retina of the two eyes must differ—the one including more of the right-hand side, and the other more of the left-hand side of the same solid or projecting object,

Perfect vision and perfect representation of solid objects in monochrome cannot be obtained without two eyes and without two pictures taken at a suitable angle of view; and it is by the combined effect of the images produced in the retina of each eye, and the different angles under which objects are observed, that a judgment is formed respecting their solidity and distances. You will observe that I am talking of pictures in monochrome, because the artist proper has special advantages in representing objects with regard to solidity and distance in the use of colour apart from light and shade, or, rather, in addition to light and shade.

It is well known that blind men who have been restored to sight cannot tell the form of a body without touching it until their judgment is matured by experience, although a perfect picture may be formed on the retina of each eye. A man having only one eye cannot readily distinguish the form of a body which he has never previously seen; but he quickly and unwittingly moves his head from side to side so that his one eye may alternately occupy the different positions of a right and left eye. It is, in fact, quite an amusing joke to request a friend to take the snuffers and snuff the candle with one eye closed. He is bound, in the ordinary course of things, to make several bad shots before he succeeds in trimming the wick.

It may be asked—"If the use of two eyes be so valuable in judging of distances why do people who are taking aim with a gun invariably close one eye?" But, in this case, the gun being placed against the right-hand shoulder, and the barrel being so immediately in a line with the eye with which aim is being taken, the effect of opening the other eye would be to apparently throw the end of the gun at least a yard to the right hand. If you are not satisfied that this is the case it is almost worth your while to try by holding up the finger as if you were taking aim, then closing the left eye, as you would naturally do, make a careful observation of the spot covered by the end of your finger. Now suddenly open the left eye and close the right one, and mark the apparent difference in the position of the end of your finger. Another instructive experiment is to look at an object and then press one of the eyeballs slightly, thereby diminishing or increasing, as the case may be, the angle of view, and the result is you get the object in duplicate.

Drunken men are said to "see double," because they have not the sense or sufficient command of themselves mentally to concentrate their sight or mind on one object. The consequence is they see the same object in the retina of each eye, and, the mind not working in unison or sympathy with the eyes, they see two objects for every one they look at; and the distance between the object seen with one eye and that with the other would probably be the distance between the observer's eyes, or about two and a-half inches. In playing billiards this must be very awkward, for the drunken player would see two tables, two cues, six balls, and twelve pockets.

In order, then, to deceive the judgment, so that flat surfaces may represent solid or projecting figures, we must cause the different images of a body as observed by the two eyes to be depicted on their respective retinæ, and yet to appear to have emanated from the same object. Two pictures are, therefore, taken from the really projecting or solid body—the one as observed by the right eye only and the other as seen by the left. The picture is then placed in the stereoscope, which is furnished with lenses so constructed that the rays proceeding from the respective pictures to the eyes should be refracted at such an angle as each set of rays would have formed had they proceeded from a single picture, occupying the centre of the instrument, to the respective eyes without the intervention of lenses. No human hand could draw or paint sufficiently accurately to produce any but geometrical figures for the instrument, but photography kindly steps in and does the work for us.

In former days the pictures taken for the stereoscope were daguerrotypes; and, by the way, let me remark that next to a glass transparency I have reason to believe the daguerreotype is the process most suited to the purpose. I sincerely wish I could induce some one present to try a few of these pictures for the stereoscope of still life—such as dead game, flowers, or fruit—by way of an experiment. I am sure it would repay him for his trouble if they were only done for private use. I regret I have neither the time nor the money to experiment, as I long to do at times. The advantage of the daguerreotype over paper slides in the stereoscope are many, and the disadvantages are not so great that they may not be overcome with a little ingenuity. Paper is simply abominable to any one who knows and can appreciate the tenderness and delicacy of a well-toned transparency. (You must not think I am abusing paper photographs wholesale; but bear in mind that I am speaking only of paper used in making slides for the stereoscope to be viewed either by reflected or transmitted light.) No paper has yet been made that will stand the test of the stereoscope. Who ever saw a sunlit cloud properly represented on paper, with every bit of detail from the highest light to the deepest shadow? Who ever saw water represented on a paper photograph that would bear the slightest comparison to water in a transparency? Or who ever saw anything on paper that gave one the feeling that atmosphere existed between the foreground and distance? You may see a fuzziness, but fuzziness is not atmosphere.

Now, as paper is not a suitable material for pictures that have to undergo the test of the stereoscope, and glass may be considered to have serious drawbacks commercially, I make a suggestion which is quite at your service. It is to print your slides, or transfer them to gelatine or tough collodion films or tissue, and use them with some arrangement akin to Mr. Warnarke's roller dark slide, so as to bring a succession of pictures into the field of view instead of the somewhat clumsy arrangement at present in use, which is always getting out of order. I mean the boxes to hold from 50 to 100 slides. You have tissue negatives; why not tissue or pellicle transparencies? I have made experiments in this direction that warrant my recommending this to the serious notice of those in the trade.

The four slides you will find on the table are glass subjects taken by Mr. Breese. It may not strike you that there is anything very much out of the way in these slides, or that they are superlatively good of their kind. They are, however, as near perfection as possible, and you will find they are all composed of as difficult a combination of things that could be brought together to test a photographer's skill; but you will find every bit of tender, reflected light, and half light is present as in nature itself—every bit of detail, from the highest light to the deepest shadow. Nos. 1 and 2 were photographed on Mr. Breese's own drawing-room mantel shelf. His brother being in the glass trade accounts for his having so many beautifully-cut glass and other ornaments. The exposure for the negatives, Mr. Breese told me, was twenty minutes.

I may as well mention here, once for all, that Mr. Breese's transparencies are camera printed, and that he invariably used pyro. development. He worked with the ordinary three-grain pyro. developer reduced three times, or a one-grain pyro. developer. For his very quickest pictures (no man ever did quicker ones) he used a developer no stronger than the usual three-grain pyro. I could never induce him to give the iron developer a fair trial. Once, indeed, he tried it at my urgent request; but the quality of picture he got did not satisfy him, and I could not get him to try again.

Mr. Breese kindly spent four hours in colouring me a duplicate of No. 7 slide, for which I paid him a guinea. I regret to say it has since come to grief. It was most beautifully coloured—not both sides alike, as I have seen some transparencies done; but in colouring one of the lustres, for instance, he would proceed thus:—He would put on a dab of perfectly-transparent yellow on one side of the stereo. picture, and on the corresponding portion of the lustre on the other side he would put a small dab of Prussian blue and a small dab of red, so that the blue and red should partly overlap the yellow when seen in the stereoscope; and he would proceed thus with either side of the slide till it was done, in no instance painting the two sides alike. Suppose he wanted to paint a tree or a field, he would paint one side of his slide with broken yellows and the other with broken blues, and the result when seen in the stereoscope would be various shades of green. The difficulty is in getting colours sufficiently transparent and pure for the purpose, otherwise most charming effects may be got, especially when prismatic hues are to be represented.

A silver ewer figures in three of the slides on the table. This ewer was given to Mr. Breese by Mr. Elkington as a present, in acknowledgment of some service he had rendered that gentleman in photographing his family and house at Croggan, North Wales, and for which Mr. Breese refused to accept payment. Inside the jug was a ten-pound note, with the following words written on it:—"To pay for the collodion"—a very handsome and neat acknowledgment on the part of your respected townsman.

You will find on the table two moonlight views. These are favourite subjects with Mr. Breese, and he is the only man who has had any real success in rendering moonlight effects for the stereoscope. Sometimes Mr. Breese took negatives on purpose to convert them into moonlight transparencies, and these are generally his best productions; but if it so happened that he found he had got an under-exposed negative he would not allow the development to go too far, and would put it by to make a "moonlight" of it at some future time. The negatives when taken with a view to be turned into moonlight pictures were carefully studied beforehand, and a favourable opportunity of taking them was patiently waited for from day to day. They were then taken with short exposures in full sunlight, and the development stopped before too much detail made its appearance.

Now, in printing a transparency for a moonlight picture the moon has to be printed in where the sun really was in taking the picture. This is done as follows. I am now about to come to the pith of my paper, and to tell you what no living man besides myself knows anything about, and this is combination printing for the stereoscope, though I should not be at all surprised if some one crops up in future who knew how it was done all along. As, however, at least two months will elapse before I am able to give the second part of my paper, a good opportunity occurs for people to say what they may have to say about the matter. I have no fear of being anticipated in what I have to say. In giving this information I do not wish to take any credit to myself. I did what any man might have done under the circumstances. I bought the information with the negatives, and I bought the negatives for the information. I gave Mr. Breese for the negatives a cheque for £80, intending some day to go into the matter commercially (which I may do yet, as far as I know), but at present the information is of no service to me, and I thought it might give a fresh spurt to the trade if I tell you what I know about the matter.

I find the time is slipping away, and that I must bring my paper, or, rather, the first part of it, to an abrupt conclusion, as I wish to afford you sufficient time for discussion and to answering any questions that may occur to you. I think I can promise you a more interesting paper next time. I shall begin by telling you how moons, seagulls, clouds, animals, figures, &c., may be printed into transparencies stereoscopically—that is the rub. Combination printing for paper work is comparatively child's play. I shall tell you, as far as I know, Mr. Breese's pet solutions and formulæ. I shall show you my printing apparatus, made according to Mr. Breese's pattern, and shall, if possible—but this I cannot promise—print a combination picture in your presence. S. H. Ashley Oakes.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

As we are publishing the communication of Capt. Abney *On the Theory of the Destruction of the Undeveloped Photographic Image* in another page, we are now enabled to redeem the promise made last week to give the short discussion that took place, which we do from the official notes of the report:—

Mr. Pearsall observed that, in the Society's rooms, some years ago, after speaking of the philosophy of photography, Sir William Grove referred to several experiments, which he thought had not been sufficiently followed out, and recently he (Mr. Pearsall) had, at the request of Sir W. Grove, searched for the records of these experiments for this purpose. In these experiments Sir W. Grove had taken a sheet of glass, on which he placed, in letters of tinfoil, the word "Volta." He then passed the electric spark through the word, thinking to get some particular effect from the discharge. Greatly to his surprise, when he removed the tinfoil there was no development where the letters had been, but a development in every part of the glass not covered by the tinfoil, the pictures on which the latter had been placed being clear while the remainder was cloudy. Sir W. Grove thought that these experiments might be pursued with advantage, and for this purpose he (Mr. Pearsall) had mentioned the fact to Capt. Abney as a thing which ought not to be allowed to stand alone, and the result of Capt. Abney's further researches they had had that night.

Mr. Sebastian Davis said that he wished to make an observation in reference to a fact which, in his opinion, seemed somewhat to militate against the theory of fading which had been advanced that evening. He referred to the action of tannin, or tannic acid, and gallic acid upon sensitive plates. It was well known to photographers in the days when tannin was much used as a preservative, that the plates, when washed with the usual ten or fifteen-grain solution, had to be developed very soon after exposure, as they soon deteriorated, although the time between preparation and exposure might be considerably extended without any bad effect following. But it was also noticed that the contrary was the case when a wash of gallic acid was applied, and plates so prepared could be kept for a lengthened period between exposure and development. He (Mr. Davis) had brought this before the photographic world many years ago, and that it was true had been established, beyond a doubt, by a great many experiments. Indeed, there was no chemical agent which had a greater power in regard to the preservation of the image than gallic acid. But instead of its being an oxidising agent it was a reducing agent, and he (Mr. Davis) thought it would be well if some explanation could be given of this apparent contradiction, why gallic acid, a reducing agent, was capable of preserving the image on the photographic plate for an indefinite time.

Captain Abney observed that the end of the letter would furnish an answer to Mr. Davis's objection.

"Is it not probable that the keeping qualities of certain plates, when washed over with gallic acid, may be due to an oxygen absorber being present, which the atmosphere must first saturate before it can hope to attack the silver image? Apparently a preservative for a dry plate should be impervious to the air, and for double security it may be presumed it should contain some substance more readily oxidised than the atoms forming the image."

The fact was he had tried both tannin and gallic acid. Tannic acid had certainly not the same effect as gallic and pyrogallic acid. Gallic acid when flowed over an exposed plate preserved the image from the action of ozone. Sugar of milk also preserved the image, but he did not attribute the effect in this case to the same cause. Oxygen absorbers preserved the image from fading, but he was not inclined to agree that tannin was an oxygen absorber.

Mr. Davis: I should rather term it a reducing agent.

Mr. Spiller remarked that the subject was one upon which he had had a little discussion with Captain Abney. He was rather inclined to agree with Mr. Davis, and use the term "reducing agent"—at all events, in the sense in which he applied it, rather than "oxygen absorber." A reducing agent was not necessarily an oxygen absorber, since it might have an affinity for chlorine.

Captain Abney: In the case of a bromide film gallic acid is *not* a reducing agent at all.

Mr. Davis: That is scarcely borne out by experiment. A plate can be developed by gallic acid, though I admit its action is very weak, and not nearly equal to pyrogallic acid.

Captain Abney: I fancy we are rather at cross purposes as to what we actually do mean. Pure bromide of silver exposed to light and treated with gallic acid for months, whether *in vacuo* or not, certainly does not show the slightest reduction.

Mr. Spiller: And still it is an oxygen absorber.

Captain Abney: Yes, but it must not be regarded as a reducing agent in the presence of pure iodide or bromide of silver. If you introduce silver nitrate you get a different state of affairs altogether.

Mr. Spiller: That is so; in this case then gallic acid is not a reducing agent.

The paper of Mr. Viles and other matters were then proceeded with, but as we referred to these in our last issue further allusion is not now necessary. The papers by Capt. Abney and Mr. E. Viles will be found in our present number. We have been compelled to leave over Mr. E. Cocking's paper till our next.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The third ordinary meeting of the session was held in 5, St. Andrew-square, on the evening of Wednesday, the 9th inst.,—Mr. John Lessels, President, in the chair. Fortunately there was not a large attendance, as, in consequence of the change of the day, the meeting had to be held in a small upper room, the ordinary large room being occupied by another society.

Messrs. John Jackson, John Terras, and J. K. Tulloch were unanimously elected ordinary members of the Society. Dr. John Nicol then read a paper, entitled *The Progressive Results of the Past Session* [See page 27], in the course of which he solicited the indulgence of the members, as he found that every recurring year rendered such a paper more difficult to prepare, and he found the journals for the past year specially barren in matters of interest.

Mr. W. Neilson remarked that all anniversaries were pleasant, and as Dr. Nicol had always written the annual summary it was pleasant to find him still doing so, though he could not agree with all he had said. In connection with the electric light for nocturnal portraiture, he considered there must of necessity be an overpowering glare, rendering the pose far from comfortable to the sitter. He had some first-rate carbon enlargements produced for him by Mr. Annan, of Glasgow, and recommended that the original small negative should be slightly under-exposed, as it then in a great measure rectified the flatness always apparent in enlarged prints.

The Chairman, in the course of his remarks, spoke very highly of the plates prepared by Mr. Gray, saying they could be thoroughly relied on for producing really good negatives of the most difficult subjects. He had himself procured valuable records from the very dimly-lighted interiors of ancient edifices on the continent and elsewhere by means of them, and, indeed, for interiors or exteriors he did not know of any plates that could surpass them.

Dr. Thompson was gratified to find, from his own observation, that in the average work turned out during the past year there was a return to a more healthy condition; there seemed to be a greater determination to produce perfect negatives, and less dependence was placed on the work of the retoucher. At one time retouching was much overdone; but he was glad to find that the main effort seemed to be to get as good a negative as possible in the first instance, and do as little as possible by way of hand-improvement afterwards. His own experience had not been altogether favourable to carbon work, as he found that he could not get prints in pigment equal to those in silver; but he believed a reason for that might be found in the fact that his negatives were specially suited for silver printing.

Mr. Alex. Nicol had noticed that for carbon enlargements produced by the Autotype Company a slightly under-exposed negative always produced the best results. In his ordinary work he sought to get fully-exposed negatives, so as to secure soft silver impressions; but when such were sent to be enlarged the resulting prints were always flat. He had even noticed that a negative giving hard, black and white silver prints, when enlarged produced very satisfactory results.

Mr. Balmain said that in his experience he always found that "like produces like." If the original negative were under-exposed the same effect was reproduced in the enlargement. His general plan, when he intended to produce an enlargement, was to strengthen the small negative so as to get a carbon transparency exactly to suit the picture he desired to make, and then enlarge the transparency in the usual way.

Mr. Turnbull, after remarking that the tendency of all enlarging was to flatten, gave some information concerning an apparatus for generating the electric light, in the erection of which he had recently been interested. The machine gave a light of 1,000 candles at a cost of about £80, and was worked by a three-horse-power engine.

The conversation then turned on gas-bags.

Mr. Aird (whose experience gave weight to his remarks) said that a bag belonging to the Society, supplied by a well-known maker, and which had so unexpectedly broken down, had been made of india-rubber improperly prepared in the firing. As a rule it would be found that cloth which had only sufficient india-rubber to render it air-tight would be more serviceable than that which had a thick layer.

At the close of the meeting a number of copies of that useful annual, *The Photographer's Pocket Almanac and Reminder*, presented by Messrs. Cussons and Co., of Southport, were distributed to the members present.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

A meeting of this Association was held on Wednesday evening, the 9th instant,—Mr. John Stuart, President, in the chair. There was a good attendance.

The minutes having been read and approved,

Mr. McGhie read a paper *On Emulsions* [see page 28], and afterwards exhibited a large number of transparencies by the sciopticon. The negatives and transparencies from them had been produced by a variety of processes. After the paper was read and the pictures exhibited the members expressed themselves highly pleased with the paper, and hoped Mr. McGhie would soon favour the Society with another paper with his extended experience on the same subject. He was awarded a hearty vote of thanks, as also was Mr. Bell, who assisted with the lantern.

The Secretary showed one of Fletcher's (of Warrington) instruments for producing lime light without oxygen. It gave a pretty good light, but much inferior to the oxyhydrogen. On account of the air which is used instead of oxygen requiring to be forced through the common gas with a powerful blower, there is a hissing sound which is not very agreeable; but the members were very much pleased at having the opportunity of seeing the light and examining the instrument, and thought it was a move in a direction from which other improvements might yet be expected.

Mr. Fletcher was awarded a hearty vote of thanks for showing his apparatus, and after a vote of thanks to the President the proceedings terminated.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held on Thursday, the 10th inst.,—Mr. A. Brothers, F.R.A.S., President, in the chair.

The minutes having been read and passed, Mr. George Gregory was unanimously elected a member of the Society.

The President said it was in contemplation to hold a *soirée* and exhibition at the end of the year, and that a lantern exhibition, including other objects, would form the chief feature of the February meeting.

Mr. Hellawell said he had brought the negatives he had alluded to at the last meeting for the inspection of the members.

The President said experience had led him to the opinion that there really was something in supplementary exposure to coloured light.

Mr. W. J. Chadwick exhibited an instantaneous shutter made by himself many years since.

Mr. S. H. Ashley Oakes read a paper on *Combination Printing for the Stereoscope.* [See page 29.] He showed some charming specimens, including a number of views by the late Mr. Breese, many of which had been separated to show how they were built up.

The thanks of the members were voted to Mr. Oakes for his interesting paper, and the meeting was adjourned.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Society was held in the Theatre of the Bristol Museum, Queen's-road, on Tuesday, the 8th inst.,—Mr. W. W. Stoddart, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the entertainment announced for the evening was commenced, viz., "a trial of lanterns."

Two lanterns which were expected did not arrive, namely, Hughes's triplexicon and a stella light of the old style. The three shown were, therefore, as follows:—Steward's institution lantern, and pyro.-hydrogen light, by Mr. Brightman; Woodbury's original sciopticon, by Mr. T. Davey; and the euphaneron with Newton's refulgent lamp, by Mr. H. A. H. Daniel.

A number of slides were exhibited, and the verdict was that the first place was taken by the sciopticon; the second by the euphaneron and Newton's refulgent; and the third by Steward's lantern and pyro.-hydrogen light. It must, however, in fairness be remarked that neither the owner of Newton's refulgent nor Steward's had possessed their lanterns beyond a very short time, and were not sufficiently experienced in the use of them; also, that they had, on a former occasion, a most successful trial. It was understood that a new trial would take place. The testing was most interesting, and occupied the whole evening.

Correspondence.

FRILLING OF GELATINE NEGATIVES.

To the Editors.

Gentlemen,—The frilling of gelatine negatives evidently troubles a few of your readers. If your Journal was made more of a manual there would be fewer failures.

Many months ago the Rev. H. J. Palmer reported upon this subject at a meeting of the Liverpool Amateur Photographic Association, and stated that, by the use of a small quantity of Hunyadi water, he had overcome this tendency. A rough qualitative analysis of this water shows it to be impregnated with sulphate of magnesia (Epsom salts) and chlorides; and there is no doubt that where the water is too pure (*i.e.*, soft) the addition of a small quantity of soluble mineral substance would be beneficial.

If I might make a suggestion without appearing presumptuous, I should like to point out the great assistance it would be to readers and workers if the formulæ so often given in French weights and measures were first translated into English; the work of one would then help all, whereas, now, each has to search out for himself the equivalents if the matter is to be of any use to him. Apologising for troubling you,—I am, yours, &c., J. H. T. Ellerbeck.

7, *The Elms, Peel-street, Toxteth Park,*
Liverpool, January 14, 1878.

JOHNSON'S NEW CARBON PATENT.

To the Editors.

Gentlemen,—I think Mr. J. R. Johnson scarcely understands his position when he speaks of the "vulgar imputations" contained in my letter. He appears on the photographic stage with a portentous new patent covering a wide field of carbon operations, and making prodigious claims. I attack, in the public interest, one of these claims, and point out that Mr. Johnson has appropriated almost literally for his personal ends the process of reversing negatives given years ago to the profession by Mr. Wenderoth. Instead of making an apology for having appropriated (however unwittingly, another man's ideas) he coolly says he will "take an early opportunity of doing that which the law provides when such a mistake has occurred."

Mr. Johnson's name is perfectly well known in the photographic world. He has been one of the most controversial of contributors to the journals. He has been keenly interested in carbon printing from the commencement, and is about the last man one would have expected to plead ignorance. However, he has raised this plea, and I unhesitatingly accept it. His name is honourably known in photographic annals, and he has simply mistaken in this Wenderoth matter faint stirrings of memory for the inspiration of original ideas. My contention, however, is that having through ignorance attempted to restrict the rights of the whole body of the profession in a process which may shortly be of peculiar value, the least Mr. Johnson could do was to have expressed regret that he had so erred, and not attempted to pass as an injured inventor.

I feel the majority of the profession will coincide with me in the opinion that all attempts to extend the carbon monopoly should be jealously watched, and if patents are attempted embodying preposterous claims their exposure in the plainest language is fully warranted. I am pleased to note the disclaimer of the Autotype Company as to any foreknowledge or interest in the Johnson new patent, and to apologise for the imputation made in my previous letter.—I am, yours, &c.,

Great Yarmouth, January 14, 1878. W. S. Miller.

[We embrace this opportunity of correcting a clerical error in Mr. Johnson's letter last week, and to which the writer has directed our attention. In that letter Mr. Johnson is made to say (see last paragraph) "*I am only pleased*, as an excuse for my ignorance, that I was in a foreign country," &c. For the first four words, which we have italicised, *read*—"I can only plead," &c.—Eds.]

CLEANING POT OPAL.

To the Editors.

Gentlemen,—I see in your issue of December 28th, 1877, a query from a correspondent for a method by which pot opal may be cleaned after it has been used.

The stains caused by nitrate of silver or the article used in development may be removed by a solution made of equal parts of nitric and sulphuric acid, and well washed. After such treatment I have always found the glass clean and equal to new.—I am, yours, &c.,

25, *Williamson-street, Liverpool,* Richd. Crowe.
January 12, 1878.

COLOURED VARNISH.

To the Editors.

Gentlemen,—In the last number of the Journal I see described a method of making coloured varnish.

The formula there given is, no doubt, very good, but if you will permit me I can inform your readers of a much simpler one which I have often used, and which has also the advantage of being able to obtain any colour. It is prepared by simply adding any of the liquid dyes to the ordinary spirit varnish, a very few drops being quite sufficient.

I have used some of those colours to impart a warm tone to lantern slides, and also stereoscopic pictures on glass, and it produces a very pretty effect. The objection in using it with the former is that where slides for the lantern have to be coloured the tint is objectionable.—I am, yours, &c., W. England.

London, January 16, 1878.

THE NEW ALMANAC—A CORRECTION.

To the Editors.

Gentlemen,—Kindly excuse my taking up space in your columns with a personal explanation; but, as some misunderstanding has arisen through a mistake of your printer, I shall be obliged if you can find room for this correction.

In your Almanac for this year, an article by Mr. H. Cooper, of Northampton, is credited to me, whilst one of my contributions is attributed to my namesake.

As the article which I did *not* write is entitled *Hints from Practice in a Small Studio*, and as the author speaks of his sixteen years' professional experience, many of my friends have been sorely puzzled. I should be sorry to deprive my namesake of the credit of his suggestive article, and also wish to assure the readers of the Journal that I have not been sailing under false colours for these many years past. As most of my friends know, I have never had any professional or commercial connection with photography in any way whatever.

My own contribution (which has been attributed to the wrong writer) is a short epitome of an improved method of printing on textile fabrics.

The formulæ I have recommended have given most satisfactory results, and I can cordially advise all those interested in this branch of photography to give the method a fair trial.

A modification of the same formulæ gives a good process for "plain" paper prints.

The only novelty is the use of the lactate of silver. This salt is a great favonrite of mine. I have proved its usefulness in emulsion work for the camera, in collodio-chloride printing on glass, and in printing processes generally; so I ought to speak well of its merits.—I am, yours, &c., Henry Cooper.

Homehurst, Torquay, January 16, 1878.

[The mistake alluded to by Mr. Cooper, which is regretted, is one which arose from one of the officials in the printing works having unfortunately misinterpreted our instructions relative to the means of making the distinction clear between two contributors bearing the same name, one of whom is a professional photographer, the other being one of our best-known and ablest amateurs.—Eds.]

DOUBLE-COATED PIGMENT TISSUE.

To the Editors.

Gentlemen,—The letter of the Autotype Company last week, in stating that I "broached an idea" in 1871, though quoting my own words, does not fairly state the case, because I was thereby calling attention to two former articles of mine, which detailed the fact, supported by proofs of my having at that date practically carried out the idea.

Having done so, and desiring more perfect tissue than an amateur could make, I applied to Mr. J. A. Spencer, then associated with the Autotype Company. He very courteously promised to assist me; but, from some cause or another, the suggestion was never carried out. I have still in my possession a letter from Mr. Spencer, which, being a private one, I am not at liberty to quote without his permission; but this I may say—that, from the tenor of it, one might legitimately draw the conclusion, which I did at the time, that no such tissue had been made at the Autotype Works before that date.

I am willing to make the confession that I was not aware the license to Messrs. Marion and Co. extended to manufacturing tissue. I regret having overlooked the announcement of this recent limited concession. Still my ignorance is not more strange nor more inexcusable than that of the Company, who might reasonably be expected to know everything connected with the subject, in ignoring the fact of my having originated much more than "an idea" in 1871, and throwing a doubt upon the well-established fact of my having "made my wants known" at that time.

However, I am now informed that the monopoly has been relaxed in favour of one firm for six months past, and the deduction attempted to be drawn from it is that they could have made double as well as single tissue. This is rather a *non sequitur*. At the rate of progress of the Autotype Company one would hardly expect a new concern in so short a time to bring out a novelty, or to do more than supply ordinary tissue in competition with an old-established firm. If they do not do so in less than six years it may justly be said of them, also, that they have allowed an improved process "to lie dormant."

The quotation from Mr. Sawyer's address has no date given; but, as the "*Liber* prints" exhibited four years age are alluded to, it may fairly be inferred that his words were used several years after my experiments had been published, and therefore no claim can be made for them of originality, and the evidence of the letter above alluded to tends to the belief that no such tissue had been made by the Company before I described it. I admit that "the idea" might have existed at an earlier date "*in nubibus*," and even within reach of an ordinary flight of imagination.

Had the Company done more, when Mr. Sawyer delivered his discourse, than apply the invention to the particular case given? It would seem not, from the expression of doubt used by Mr. Sawyer when he says:—"Is it possible to produce a harmonious and artistically-tinted photograph simply by superposition of colours over each other?"

If the Company had already invented and made such a tissue, why was no notice taken of my publication in 1871? It was again brought forward, without challenge, in your Almanac of 1873. Why did they not *then* say what they now assert, namely, that they were prepared to supply double-coated tissue? Why not advertise it the same as other improvements? *These* are not "hid under a bushel," or left to be "demanded" by the public.

I had no intention of writing in an "offensive" style. The expression objected to was used as being emphatic and concise. I should not have supposed this Company so thin-skinned. Companies generally are not noted for extreme sensitiveness or delicacy of feeling, and the present one, if so constituted, might have long since exhibited it by acknowledging their indebtedness to amateurs.

After the above statements your readers may judge whether my expressions were more severe than are warranted by the facts of the case.—I am, yours, &c., G. S. Penny.

Cheltenham, January 14, 1878.

EXCHANGE COLUMN.

Wanted to exchange, a first-class one gallon copper still, with worm and iron furnace, for anything useful in accessories.—Address, H. Buttrum, 17, Wolverton-road, Stony Stratford.

A brass-bound 1-1 camera, by Meagher, swing-back, new; 10 × 8 water-tight mahogany and glass bath, in good order; new tourist's quarter-bellows camera, three double backs and stand, and No. 1 Steinheil lens; an excellent head and body rest, Harrison's pattern, very firm; a firm, folding tripod, good as new; a sporting Snider carbine sighted to 600 yards. Wanted, Dallmeyer's 4D and 12 × 10 W. A. L. lenses, in good order.—Address, S. G. F., maker, Devonport.

ANSWERS TO CORRESPONDENTS.

Photographs Registered—

J. Rae, Dumfries.—*Portrait of Rev. J. Hope.*

E. Debenham, Weymouth.—*Group entitled "The Italian Band."*

Reginald Spurr, Huddersfield.—*Portrait of Rev. T. B. Benstead.*

W. Child, Leeds.—*Two Views of Statue of late Alderman Marsden.*

Rouch and Co., Strand.—*Two Photographs representing respectively Graphic Art and Piscatorial Art.*

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

*** Owing to pressure caused by the unusually large number of communications connected with the meetings of the various photographic societies included in our present issue, a considerable number of interesting articles are crowded out this week.

J. Starre.—To the mixture of albumen and gallic acid add a little caramel; but you must not expect that this preservative will retain its good qualities for more than two days.

J. Schofield.—For certain samples of pyroxyline the proportions of ether and alcohol given will answer; but when making use of an average quality of pyroxyline it will be much better to increase the proportion of ether.

Obliged Reader.—While we are aware of such a patent as you describe having been obtained, we do not think the invention was even tried by the patentee, who allowed his patent to lapse after the termination of six months.

T. W. T.—If the diameter of the lenses be three and a-quarter inches (the usual *French whole-plate* dimensions), and be free from scratches or other defects, the price mentioned is moderate. The name on the lens is that of a dealer.

George Hercus.—You can ascertain for yourself the effect produced upon a sensitive dry plate by vulcanised rubber by the simple expedient of slipping an elastic rubber band over the plate, and allowing it to remain for a few days or weeks.

Elsie.—When a sitter has overhanging eyebrows care must be taken not to have a dominant top light. Retouching may be resorted to as a palliative, but it will be better to use a more judicious mode of lighting as a preventive of the evil of which you complain.

Tourist.—We have no access at present to such information as would prove valuable to you; but we understand that at a distance of about three hundred miles from Alexandria are to be found several remains of temples which may, perhaps, satisfy your requirements.

J. E. G.—What we *now* advise is the use of collodion (any old and otherwise worthless sample will answer) containing, in solution, such a quantity of aurine as will give a film of a very deep orange colour. This film may be protected, and its colour intensified, by means of a spirit varnish also coloured with aurine. This we have tried, and can strongly recommend.

W. S. inquires—"How can I stain the surface of boxwood white, or nearly so? I do not want any powder to be on the surface. And what is the best way of attaching a carbon image on wood for the engraver? Alum and gelatine is not good enough. What way is the best known? I should like something twice as adhesive as gelatine."——Can any reader give the required information?

Vitromaniac.—To photograph upon such articles of porcelain as cups and saucers, you may either adopt the dusting-on process or the more easily-managed one of toning a collodion transparency and transferring it to the article into which it is to be burnt. The process for doing so has been frequently described in former numbers of The British Journal of Photography.

Tom.—The proportion of nitrate of potash is too great. Reduce it to the proportion of two parts of sulphuric acid to one of nitrate of potash, and immerse the cotton when the temperature is about 130° Fah. See that the cotton has been pulled out in small tufts previous to immersion. Allow them to remain submerged for about eight minutes; then remove the pyroxyline thus formed, and wash it thoroughly.

W. W. (Gibraltar).—Regarding the markings on the gelatine film, we are not yet in a position to elucidate the mystery, but the matter is receiving attention. A brief notice of Bainbridge's tent was published in our volume for 1875. We are at present uncertain under what circumstances the notice appeared; but we imagine that it will be found as one of the interesting things that were exhibited at the meeting of some society.

E. Varvaisse.—The pose is graceful, although the arm is not sufficiently plump to admit of such a special display as is there exhibited. But so long as your fair sitter adopts a spangle-bedecked dress, of the description shown in the picture, it will be simply impossible to produce a high-class photograph under the circumstances. The day has now long gone by when photographs having round, white splashes (we must so designate them) all over the dress would be tolerated.

X. Y. Z.—The work to which you allude was never published. We are not aware of the reason why. After being advertised its non-appearance was determined upon. We believe it would have been useful and have proved a commercial success. If you decide upon taking up and working out the idea, not only would there be nothing to hinder its being done, but, on the contrary, you might calculate upon receiving aid from a number of sources. It would be unwise to let the price exceed a guinea.

Received.—*The Photographers' Pocket Almanac and Reminder.* By D. H. Cussons and Co., Southport.—This *Almanac*, as usual, contains a complete list of the various novelties in the way of accessories and studio furniture manufactured and sold by the above firm. It contains two nice illustrations by the Woodburytype process.

S. S. (M.D.).—A stop having an aperture like a slit has been previously proposed for lenses. Indeed there is scarcely an end to the funny forms that at some time or another have, by various individuals, been proposed for these apertures. Some have imagined that a vertical slit is that which ought to suit a tall building, others that a keyhole-shaped aperture would be better adapted for the general run of subjects. All, however, are wrong; the proper form of aperture for a diaphragm is a simple circle.

Chromo-Photography.—On this subject Mr. T. Bodley, 18, Wood-street, E.C., writes as follows:—"Having recently found that the chemicals used by myself for the production of coloured photography were used by an eminent French photographer in the same pursuit, I thought it worth while to suggest to experimentalists the use of electricity on a warmed copper plate, with a film of chloride of copper, phosphoric acid, and sulphuric acid. By aid of a thirty-shillings' electric battery and the above chemicals, combined with *nitrate of silver*, I obtained a distinct 'red' and 'blue,' which withstood exposure half-an-hour. For any substance to exhibit colour it is necessary for its atoms to be held in suspension till they are in thorough sympathy with the different vibrations of light. The sulphuric acid will, perhaps, fix the colours as the film dries, and white of egg may prevent the copper from crystallising. I feel confident of the utility of a powerful electric battery in the development of colour; and perhaps some of your readers that have the time and money might like to try the experiment."

Iron writes as follows:—"In your next issue of The British Journal of Photography, in your "Answers to Correspondents," please answer the following queries:—1. How can I render a piece of plain Saxe or Rives paper transparent?—2. How can I take out the cracks that have taken place in some wax-paper cloud negatives? They were frightfully cracked when they arrived here by post; in fact, they are useless in their present condition, and I don't care about sending them back again to the dealers.—3. How can I remove the silver from some of Warwick Brookes's "Academy negatives" that has shown itself? I expect it is from leaving prints on them over night during the present damp weather.—4. This query is one of great importance, and I am afraid that it will take a very long time to master. I have for years past been dabbling in making transfers (collodion), and I have always found it very difficult to get any such fine *warm* tones as you can with chloride prints. The collodion transfers always present a very dull and disagreeable grey-black or slate-blue. What I want to know is how can I get at making some warm tones? I have tried both toned and untoned transfers; I have also tried gold for toning; but still there is something left wanting. Do you think that any modification in the collodion would attain this object?"——In reply:—1. By applying castor oil, or a solution of Canada balsam in spirits of turpentine.—2. Place the waxed-paper negatives between sheets of plain paper and go over them (singly) with a laundress's hot iron; or, hold them in front of a hot fire.—3. This query we cannot answer definitely until we know something concerning the nature of the negatives to which you refer.—4. An answer to this query will be found in The British Journal Photographic Almanac for the present year, in the course of an editorial article on *Collodion Transfers*, page 27, to which our correspondent is referred.

The Late Mr. Thomas Lampray.—With regret we learn of the death of Mr. Lampray, which took place at his residence, 25, Gaisford-street, on the 5th inst. Mr. Lampray was at one time a member of the now non-existent firm of Ordish, Lampray and Co. Mr. Lampray's name has long been known in connection with the manufacture of albumenised paper of various kinds, and, among others, of Sutton's patent paper. He died at the early age of forty-nine.

Not So Bad.—A friend makes an inquiry as to how we have overlooked any notice of the process mentioned in the following cutting from the *Newcastle Chronicle*:—"A few nights ago, at one of the Birtley 'meeting corners,' the 'crack' turned upon photography, when a bystander heard the following remarks:—Dick: 'Hes thoo ivvor hed thy likeness ta'en, Geordie?' Geordie: 'Ay, aa yence hed it ta'en on glass; it's abune ma mothor's chimley piece noo.' Dick: 'Wes thoo ivvor ta'en, Ned?' Ned: 'Ay, aa was ta'en on cairds at Newcasile yence.' Dick, to Tom (who is a bit of a wit): 'Wes thoo ivvor ta'en?' Tom: 'Ay, aa was yence ta'en on suspishon!'"—The process (our friend says) is evidently such as could be easily practised, and is very simple:—Go into a pantry or dark room and take the first plate that comes handy—silver plate preferred. On coming out expose to the light of a policeman's bull's-eye lantern, and a full-length portrait will be taken immediately.

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THE BRITISH
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OXYGEN EXPLOSIVES.

To prevent the formation of any misleading ideas respecting the heading of this article, we commence by making the assertion that oxygen does not, and cannot, explode.

It is only a month since we recorded the occurrence of one of those terrible explosions which sometimes take place—happily at distant intervals—when oxygen is being prepared. On that occasion one of the readers of the Journal, when about to prepare some of this gas, finding himself short of oxide of manganese, obtained a supply from a neighbouring chemist. Having mixed this with chlorate of potash in the proportion of seven ounces of the former to twelve ounces of the latter, he placed it in the retort; in about three minutes after the application of heat an explosion of such a violent nature took place as to blow out the windows and create an alarm in that quarter of the town where the accident occurred. The experimentalist was experienced and careful, and the only conclusion that could be arrived at respecting the cause was that some impure material had been mixed with the oxide of manganese. A sample of the latter was sent to us for examination. Such was its impurity that under no circumstances could an explosion have been avoided, the principal impurity present consisting of graphite in large proportion—than which a more dangerous substance could scarcely be found.

Every preparer of oxygen is well aware that when a mixture of chlorate of potash and oxide of manganese is heated it is the latter salt which becomes decomposed and yields the oxygen; and the knowledge of the fact that the manganese acts a merely mechanical part has often led to the inquiry as to its advantage over other substances which, it is alleged, would answer the purpose equally well without introducing any element of danger from being contaminated with a foreign body. On the assumption that the sole function of the manganese is to separate the particles of the chlorate and prevent its becoming too quickly fused into a solid mass, and yielding up its oxygen with an unmanageable degree of rapidity, other bodies having a recognised chemical inertness—such as sand—have been proposed, and in many cases adopted, as a diluent of the chlorate. If it can be shown—and this is a subject which oxygen experimentalists seem not to have investigated—that as much oxygen can be obtained from a given quantity of chlorate when mixed with sand as when manganese is the diluent, then it would become a fit subject for consideration whether, in view of the accidents that occur, it would not be well to discontinue the use of manganese. We are aware of more than one experienced oxygenist who for this reason has long since adopted sand in lieu of manganese.

We should not wish it to be inferred from what we have said that there is any, even the slightest, danger in preparing oxygen from a mixture of manganese and chlorate; for, in reality, there is no operation in the whole range of practical chemistry that is safer. But the danger lies in the unintentional mixture with the manganese of other bodies having a similar appearance to it; and it happens that the substances most likely to be used as adulterants are those whose presence leads to the most deadly results. Here let us state that we entirely acquit chemists and dealers of all *intentional* adulteration of this substance in the ordinary sense of the term, its cheapness being a complete safeguard against that; but, when allowed to lie stored away in corners of cellars, where it is not infrequently kept it is apt to get mixed with coal dust or graphite lying in juxtaposition, and the presence of which among the manganese can with difficulty be detected; it is then it becomes an engine of destruction. Again: chemists—especially those in country towns—who do not make a leading feature of supplying this article, or whose acquaintance with it is but limited, are apt to mistake it for graphite, and *vice versâ*, allowing the two to become intermixed.

We have spoken of a sample of the impure manganese which was sent to us. The following results were obtained when subjecting it to trial:—Two test tubes were charged with chlorate of potash—one containing, in addition, a fourth of its weight of manganese that we knew to be pure, the other containing an equal proportion of the impure manganese. On applying heat the former liberated oxygen in the usual manner, while the latter behaved as if it were "possessed" by a gunpowder demon of intense violence. It was fortunate for ourselves that the quantity upon which we experimented was very small.

It will still be in the recollection of many readers that, thirteen years ago, Mr. Crowther, of Manchester, lost his life—his child being also killed—by an explosion which was afterwards known to have occurred through the accidental admixture of lampblack with the oxide of manganese he was using. In that case, as in the more recent one to which we have alluded, the cause of the explosion lay in the ignition of a large quantity of gunpowder—for such the mixture really was—confined in a strong iron vessel.

To ascertain whether any sample of manganese binoxide be sufficiently pure for use in the production of oxygen, mix a little with chlorate of potash in an iron spoon and place it over the fire. If it explode or deflagrate it is impure; if not, it may be employed with safety. It is well that it should be known that the manganese may be used over and over again; for, when the oxygen-producing mixture has been spent and is removed from the retort, the washing with water to dissolve away the chloride of potassium leaves the manganese ready to be again mixed with a fresh supply of chlorate of potash. In drying it—which is frequently done on a shovel over a hot fire—special care must be taken that no soot fall into it.

It is well to remind the reader that, among the various substances which introduce danger into the oxygen retort, one of those possessing a special degree of virulence is the otherwise often-used cyanide of potassium—a fact first pointed out by Dr. George Kemp.

In conclusion: we should be glad if those readers who have had experience in the production of oxygen would give us their opinions as to the comparative merits and advantages of the following (or any other) substances used for mixing with the potassium chlorate, namely, the oxides of manganese, iron, and copper, sand, brickdust, or powdered pumice stone.

ON THE CORRECTION OF EMULSIONS AND THE REMOVAL OF FOG.

So far as we have dealt with this subject in our two previous articles our remarks have been almost entirely confined to the treatment of emulsions, in which branch only have we made any systematic course of experiments. Capt. Abney, however, has extended his researches to the treatment of dried films, where, it is needless to say, the existing conditions are in many points widely different. It is of the utmost importance, not only in attempting to trace the reactions which occur in connection with the sensitive media, but also in applying the knowledge thus obtained, to bear well in mind the minute differences of conditions under different circumstances; and we may take this opportunity of supplying an omission by calling attention to the varied conditions which prevail with different emulsions.

We dwelt at some length in our article of last week upon the reactions which occur in sensitising and correcting an emulsion, tracing step by step the changes which take place, or which we suppose to take place, in the formation of the sensitive material. For the sake of clearness we spoke of such an emulsion as containing only silver bromide and free nitrate in a certain proportion, ignoring the decomposition salts present, as well as the constituents of the collodion or other organic matter. As regards the proportion between the bromide and free nitrate that is a matter of no moment, because whatever small quantity of silver nitrate might be in excess it would find a sufficient quantity of bromide upon which to react, and any superabundance of the latter would obviously remain as silver bromide. The decomposition salts (nitrates of cadmium, zinc, ammonium, &c.) are scarcely likely to interfere with the calculations; but we cannot, perhaps, predicate as much of the organic matter. Though the latter undoubtedly plays an active part in the formation of the image under development, it is just possible that it may not participate in the formation of the latent image, or in the reactions which occur between the soluble haloid and the silver. The opinion has been expressed that the function of the organic matter is to aid the development in giving density to the image, but that it is incapable of itself receiving any developable impression. If this be so it is not difficult to understand that the reactions which produce the organic silver compound may be entirely distinct from those involved in the formation of the sensitive haloid. In the absence of any direct evidence in favour of the participation of the organic matter we have, therefore, omitted it from our calculations.

We showed last week that, in correcting an unwashed emulsion with bromide or chloride of copper (or any similar salt capable of forming an insoluble sub-salt where the conditions happen to be favourable), there is no danger of introducing complications or irregularities into the emulsion by the formation of sub-bromide or sub-chloride, owing to the immediate decomposition of the latter substances by the nitric acid set free in the previous reactions. Thus, the corrected emulsion contains only nitrate of copper which is washed out, in company with the other soluble matters, in the course of the after operations. It is immaterial, therefore, what mode of correction be adopted. When, however, we turn to the case of an emulsion which has been already washed, and still exhibits fogging tendencies, the conditions are altered. It must be understood that, whatever may be the treatment to which such an emulsion is subjected, it will be, after correction, scarcely in a fit state to be used as a washed emulsion—that is, the films will require washing previous to exposure to remove the soluble matter. If bromide or chloride of copper be used a trace of sub-salt will remain in the film, owing to the absence of any active matter capable of removing them. Nitric acid, either added to the emulsion or to the washing water, will effect the removal if such a result be desirable, though from the extremely minute quantity present little injury is to be anticipated. We are inclined to think that the presence of even a much larger proportion than could be expected to remain in the film after correction for fog would produce little, if any, effect upon the quality of the image, though we cannot speak as regards sensitiveness. A plate exposed for a brief period to light, and developed by means of alkaline pyro., so as to reduce the whole film, was treated with cupric bromide and thoroughly washed, being allowed to soak for three hours in several changes of water. One half of it was then treated with dilute nitric acid, again well washed, immersed in a preservative of copper, and dried. Upon exposure to gaslight, under a negative, a clean, bright transparency was developed over the whole plate; it was possible to trace the line of demarcation between the part treated with nitric acid and that merely washed; but, as regards clearness, density, or rapidity of development, it was impossible to choose between them.

It should be noticed, however, that in applying the bromide or chloride of copper to a plate in this manner only a portion of the sub-salt is formed in the film, a large proportion forming in the solution itself. This is especially the case with the chloride, which, as anyone who has used it for intensifying purposes knows, rapidly becomes turbid from the formation of the white sub-chloride. We have for some time employed an addition of nitric acid, in order to keep the solution clear, and cannot detect the faintest difference in the intensifying action of the acid solution. The sub-chloride and sub-bromide of copper appear to be, in fact, merely so much inert matter. In order to be "on the safe side" it would, perhaps, be as well in treating such an emulsion to use nitric acid in addition to the bromide, or to set aside the bromide salt altogether, for others act equally as well in the presence of acid.

Nitric acid we stated last week to be incapable of eliminating fog except with the assistance of a soluble bromide, or rather the latter was the only agent mentioned as possessing the power of completing its action. We believe, however, we are correct in saying that any substance capable of entering into combination with silver nitrate will serve the same purpose, unless possessing some property especially injurious to the film. Tannin and gallic acid possess this power if added to the emulsion together with nitric acid, but the film *must* be washed before exposure. Albumen gives a still better result if the plate be immersed in a dilute solution directly it has set. We have not tried the addition of the albumen to the emulsion. It is probable that the list may be greatly extended, but such are the materials of which we can speak with certainty.

Owing to extreme pressure on our space this week, we are compelled to break off at this point, but shall resume our notice of Captain Abney's and Mr. Berkeley's communications next week.

A NEW DEVELOPER FOR DRY PLATES.

It is the fortune of those placed in editorial positions that they not infrequently have imparted to them items of information in their private capacity which they are not permitted to utilise in their position as editors. An instance of this occurred some time ago, and we now allude to it inasmuch as we have been released from the promise we then gave.

On the 20th of March last year Mr. W. Willis, jun., who was then on the point of paying a visit to America, gave us information regarding a certain new iron salt which he had discovered to possess a wonderful influence in the development of dry plates. We were quite at liberty, he said, to try the method as much as possible, but he requested us to delay its publication till his return. The method in question is exceedingly simple, and we are now in a position to describe it:—

The developer is ferrous oxalate; but, as this is an insoluble salt in all the ordinary menstrua, Mr. Willis makes use of the neutral potassic oxalate as a solvent.*

The ferrous oxalate is easily prepared by mixing together a solution of oxalic acid with ferrous sulphate; a copious precipitate takes place, which is the salt in question, and which must be well washed with numerous changes of water, to remove the result of the decomposition. The ferrous oxalate thus prepared will keep for an indefinite period. As we have said, it is easily soluble in a solution of neutral potassic oxalate, and this solution is the developer to which we have made allusion.

It may be premature to say much at present respecting this new developer; but during certain experiments, in which we have seen it pitted against development with alkaline pyro., its behaviour was such as to elicit the highest encomiums upon its energy. Upon plates having received a short exposure the application of this developer brought to light images full of detail and free from fog, with a degree of rapidity only comparable with the action of an ordinary iron developer upon a wet collodion plate.

* We are here bound to recognise Mr. M. Carey Lea's suggestions and experiments described on page 305 of our last volume.—Eds.

To experimentalists in the direction indicated, it may be stated that a soluble bromide does not appear to exercise any retarding power upon the development of the image; the restrainers, so far as at present known, should consist of acids, among which the oxalic has been tried with great success, and appears to be the best on theoretical grounds, although a more extended experience may suggest one still more suitable.

PRECIPITATES *VERSUS* PRECIPITATION.

Certain peculiarities in the process of precipitation and the qualities of precipitates are known to photographers, though their possible application to certain theories has been lost sight of. Yet the various phenomena attending this class of chemical processes deserve the closest study, forming, as they do, the very groundwork and substratum of the whole photographic structure. The familiar sensitive plate—be it wet or dry, iodised or bromised or both, gelatine or collodion—owes its existence to an act of decomposition, followed by precipitation. The old daguerrean film could scarcely be justly classed under the same head; but every film since has been essentially a precipitate embedded in a more or less porous film.

To take the commonest instance: it is known to many that when a precipitate is thrown down in a solution it often carries with it a certain portion of the organic matter that may be present; in fact, with silver solutions the fact is turned to practical account. If the printing bath get discoloured it is the common practice to throw into it a few grains of citrate of ammonia, extemporised by neutralising a little citric acid with ammonia. A deposit at once forms, and soon settles on the bottom of the glass, and not only does it contain an equivalent quantity of citrate of silver, but it has carried down with it all the colouring constituents of the solution which had caused it to assume the appearance of port wine. But we are not aware that this peculiarity is turned any further to account; for we never heard of any method of imparting a foreign substance to the sensitising bath with the object of its being abstracted by the chloride of silver, though it is obvious that a large number of matters would be available, but whether they would be serviceable or not experience alone could determine.

Although the use of citric acid is well known, it is less commonly known that almost any insoluble salt of silver at the time of formation carries down with it dissolved organic matter in a similar manner. The cyanide process for clearing baths—which, since its first proposal by Mr. Tully, has grown much in favour—may, and most probably does, owe its efficiency to some such abstraction, though, of course, it is impossible to indicate what the substance is which is withdrawn. Indeed, although the fact of there being organic matters present in old baths is indisputable, nothing but the barest guesses have been made as to their constitution.

Then, again, those who use carbonate of soda for keeping their printing baths neutral know there is never any necessity to do anything further to keep them free from colour. Some have supposed that a neutral bath does not discolour; but this, we believe, not to be the true mode of stating the case. It is the addition of the carbonate of soda or the presence in the filter of the carbonate of silver, to which the absence of colour is due. And so with regard to chloride, tartrate, and many other salts, we have in our own experience found the same effect to be produced.

The question naturally arises—Is it not possible that to abstraction by iodide or bromide of silver of *dissolved* matters during the process of precipitation may be due many peculiarities special to certain places? Or may not even the very sensitiveness and the power of development itself be explainable on these data?

So far we have dwelt only upon organic matters, and of course if none were present it is evident that our question would need no answer. Some very striking light has been thrown on the subject by a communication, by Professor H. E. Roscoe, from Mr. C. F. Cross to the Manchester Literary and Philosophical Society. He points out another well-known case of a precipitate carrying down with it other matters—ferric oxide, which not only abstracts organic matters from solution, but likewise takes up a quantity of fixed alkali if present. He then points out that, though the inference that *saline* matters might be so abstracted is obvious, there yet exists no statement in print relative to such a case. He therefore made a series of experiments to ascertain the truth or falsity of such an hypothesis, and has obtained some most remarkable results, showing incontestably that such abstraction does take place, and that its amount is capable of determination by weighing. This is a result so unlooked for that it offers most pregnant suggestions to photographers; and if the insoluble silver salts could be examined with equal exactitude it is possible that much light might be thrown upon both the theory and practice of bath and emulsion work.

The following is a short epitome of Mr. Cross's results:—Ferric oxide was precipitated by ammonia from ferric chloride. The precipitate was washed from fifteen to thirty times with boiling water, till the washing gave no alkaline reaction. Sodium chloride was found in all the precipitates examined. A similar experiment was performed with ferrous ammonium sulphate oxidised by nitric acid; the results obtained were identical.

When caustic potash was used as the precipitant enough was absorbed to cause an error of 3·65 per cent. Special experiments were then made with great exactitude to discover the limits of error, the precipitate being washed with boiling water till absolutely free from chlorine. When ·2080 grains of iron was taken the abstraction of chloride of sodium by precipitate, thrown down from its solution, was ·0023 grains—more than one per cent.—with extraordinary care, taken to wash everything away, and only small quantities operated upon—precautions which, we think, have not often been taken with silver precipitate experiments.

Similar results were obtained with other alkaline chlorides and with salts of the alkaline earths, and the results all showed that if in an analysis these facts were not taken into consideration errors of grave magnitude would be made.

In another column will be found a brief note by Dr. Eder on the double bromide of cadmium and ammonium, which has recently come very much into use in emulsion work. Dr. Eder's remarks upon the instability of the ordinary commercial bromides of cadmium and ammonium are quite just, but we fear he is claiming a little too much for the double salt. We were some time ago under the impression that the latter was constant in its character, anhydrous, and not liable to absorb moisture from the atmosphere. Such, indeed, were the characteristics of the sample upon which we based our opinions; but we have since then made other samples which vary very considerably in composition, and exhibit, no matter how carefully dried, extremely hygroscopic properties. The two salts have been in all cases mixed in equivalent proportions, and it seems difficult to account for the difference in the results. One thing, however, is very certain, that, as Dr. Eder points out, the practice of strongly heating the salt to expel moisture is not to be recommended, as the ammonium salt is thus partly volatilised. We have until recently been in the habit of *fusing* the mixed bromides, which would sufficiently account for want of uniformity in the combining equivalents; but the exhibition of hygroscopic propensities would seem to depend upon some other cause. Possibly the double salt is only permanent when the cadmium and ammonium are mixed in certain definite proportions, and if the balance be destroyed instability is the result.

ON THE DESTRUCTION OF THE LATENT IMAGE AND THE ACTION OF SILVER NITRATE ON SILVER BROMIDE.

While I quite follow Captain Abney in his opinion that ozone, probably, may form Ag_2O (or Ag_2O_2?) with one atom of the Ag from each of the molecules of Ag_2Br, produced by the action of light upon Ag Br—especially as nascent hydrogen restores the image to some extent—I do not incline to the belief that an exposed plate, kept in a plate-box, would in any way be affected by ozone, especially in London, where the latter commodity is unluckily exceedingly scarce.

Then, granting its presence, is it not doubtful whether ozone, in its exceedingly diluted state, would practically affect the sub-bromide forming the "invisible image" in the way stated? It seems to me one thing to submit plates to an atmosphere of ozone, and another to place them where only traces of ozone may occasionally get at them. But this is reasoning from a negative point of view. I will, therefore, try to explain how, in my opinion, the effect of exposure to the actinic rays is obliterated.

When a washed emulsion—that is, silver bromide in contact with a halogen absorber—is exposed to light, the bromine ejected enters into combination with the pyroxyline; how I cannot pretend to say. If the necessary quantity of organic matter be not present the bromine may continue in the free state, unless, indeed, the action of the light be counterbalanced by the desensitising effect of the organic bromine compound.

After keeping the emulsion in the dark for some time the emulsion is found, speaking generally, in its normal state again—a fact evidently due to the action of the organic bromine compound. If anyone doubt the fact that the bromine is engaged by an organic substance, I would ask how he supposes the organifier acts as enhancing the sensitiveness—notably tannin with iodide plates.

However, to supplant theory as much as possible—though that is all very well as a leading string—I would ask such doubters to coat a plate with bromide emulsion (washed or otherwise), and to soak it, when set, in a dish of distilled water, until no cloudiness is observed in a portion of the water on acidifying with nitric acid and on the addition of silver nitrate. Then, taking the plate on a clean plate-holder, let him pour a little distilled water over both back and front of the plate, and then hold it before a lamp or gas jet for a much longer time than would be necessary to print a positive by superposition. Now take in a clean cup enough distilled water to cover the plate, and flow it over the latter several times, allowing it to soak for a minute or two. After this test the water contained in the cup in the same way as before, and if no cloudiness result I think he will be entitled to come to the conclusion that the bromine, though probably disengaged—that is, the action is chemical—remains in immediate contact with the sub-bromide, $Ag_2\,Br$, only in *combination.*

Now, just as a soluble bromide, when present in quantity in a bromide film, destroys the effect of the light in the course of several weeks (gallic acid having the opposite tendency to reduce the $Ag_2\,Br$ to metallic silver), so the insoluble organic compound of bromine parts with its bromine, *only much more slowly*, to restore the $Ag_2\,Br$ to Ag Br. This action is slow, and accounts for the good keeping properties of plates prepared with emulsions made with excess of silver nitrate; indeed, the silver organic compound formed may bind permanently a large portion of the liberated bromine; and I much doubt whether such an exposed plate would appreciably lose any of the results due to exposure to light, even in the course of years, much less of months, if kept in a pure atmosphere of the best kind of country air.

With reference to your leading article in last week's Journal, there are still some points on which I am not satisfied. To begin with: by the action of silver nitrate on silver bromide you set free "NO_3," which you call "nitric acid." Now, if we had a H in combination with "NO_3" we should have nitric acid. What "NO_3" in the free state would look like I really don't know; but I presume that you consider it would be apparent on keeping some pure silver bromide in water in contact with silver nitrate. Granted we can isolate "NO_3," then we may suppose that it would combine with the copper, as by the following equation, which is a transcription of your own:—

$$\begin{aligned} &2\,Ag\,Br + 2\,Ag_2\,Br_2 + 2\,NO_3 + Cu{\cdot}Br_2 \\ &= 4\,Ag\,Br + Ag_2\,Br + 2\,NO_3 + Cu\,Br \\ &= 6\,Ag\,Br + \begin{matrix} NO_2 \\ NO_2 \end{matrix} Cu\,o'' \end{aligned}$$

But as "NO_3" is not nitric acid, and I do not see how NO_2 Ho could be formed, I think we must give up this theoretical method of forming Ag_2 Br, though free NO_2 Ho, added to a fogging emulsion, may aid the formation of the Ag Br after the manner suggested in your article; but then H_2 must be set free, or water and nitric oxide be formed, the latter being the action of nitric acid on *metallic* copper. On which reaction would take place I am not able to give an opinion.

Of course I do not mean to infer that nascent NO_3 could not enter into combination with the copper of cuprous bromide without any such evolution of gas; but you, by your fogging theory, have to dispose of NO_3 in a fogging emulsion, and what have you got for it to combine with? With organic matter? If so, I can imagine that, on the addition of cupric bromide to the fogging emulsion, it would perform a part in the reaction in the way stated by you. Granting, however, the possibility of the NO_3 combining with organic matter, we would be led to suppose that no fogging action can take place with pure silver bromide, silver nitrate, and water, in the manner stated by you, as there is nothing for the NO_3 to combine with.

I at one time thought I "had it" when *on paper* I set out the mystic formula—

$$Ag\,Br + Ag\,NO_3 = Ag_2\,Br + NO_3;$$

and, if I remember rightly, I suggested some such action to Capt. Abney. He soon, however, dispelled my illusion; and, though the action of cupric bromide has been made plain to me for some time, I still fail to understand how the Ag_2 Br is formed.

I am not quite certain whether a solution of pure nitrate of silver has been proved to have a fogging action upon pure silver bromide. I refer to what would happen if pure silver bromide were acted on in this way, and were then washed thoroughly, ground up with collodion, and "developed," irrespective of image, quality, and soforth. Would such emulsion fog? And would it fog more than another prepared in the same way, only with free bromide?

I could never understand why an emulsion may be made with gelatine and excess of silver nitrate without any "restrainer," and yet, instead of getting into a fogging state, it will rather work cleaner on keeping. The free silver is washed out, and proved to be present, previously to coating the plates.

The reader may say:—"Of course the gelatine acts as a restrainer." Well, I do not doubt that gelatine is a "restrainer" in a certain sense, as restraining the action of the developer and preventing abnormal reduction; but I cannot go so far as to allow that it would be a restrainer of the supposed action of silver nitrate on silver bromide, since, if it do not prevent the total conversion of soluble bromide into silver bromide, there seems to me no reason to expect that it would successfully prevent the Ag of Ag NO_3 from taking hold of one atom of bromine from 2 Ag Br (or, as the true molecule *may* really be, $Ag_2\,Br_2$, the Ag in this case being a pseudo-dyad, this latter formula may give a better insight into the supposed action of either light or silver nitrate).

It may be said that the gelatine, though powerless to prevent the formation of the silver bromide, may yet be sufficiently powerful to restrain the more feeble affinity of silver nitrate for bromine in combination with silver. If this be so, we must allow that gelatine exercises a greater influence than nitric acid, as we generally add the latter; for nitric acid, undoubtedly, as you yourselves state, does not prevent the formation of the supposed sub-bromide. Gum arabic also prevents the formation of fog, and yet it cannot be considered a powerful restrainer of abnormal fog produced on development; and if we attribute its retraining power in emulsion to the presence of organic acid, produced by incipient decomposition, we must allow that an organic acid may be a more powerful restrainer of silver nitrate than nitric acid itself. Reasoning in this way has often suggested to me the idea that it is an organic compound in the pyroxyline to which we owe the fogging action of excess of silver nitrate.*

Besides, though the affinity of bromine for silver may not be great, there seems hardly sufficient reason why bromine should leave the fully-saturated bromide to go to an atom of the same metal (or to two atoms, if formulated as above)—

$$2\,Ag_2\,Br_2 + 2\,Ag\,NO_3 = 2\,Ag_2\,Br + Ag_2\,Br_2 + 2\,NO_3),$$

especially as the NO_3 has no base to combine with, unless it enters into combination with an organic body; and even then would remain the question of what becomes of it when no organic body is present, as when silver bromide, silver nitrate, and pure water are used, as suggested above.

I hope that I have made my meaning plain, though I am aware that some points have been almost unavoidably reiterated in the course of my argument. I need not say that I shall only be too glad to be set right on any point on which I may hold a mistaken view; and I therefore hope that those whose judgment is far more worthy of consideration than my own will not think it time wasted to do so. HERBERT B. BERKELEY.

ON THE PRACTICAL USE OF VARIOUS SALTS OF BROMINE IN EMULSIONS.

ONE principal thing which is required of bromides used for emulsions is that they be stable in their composition, as it is from their composition that the exact bromine contents of the salt is calculated, and the maintenance of an exact and due proportion between the bromine and the silver is of great importance.

* In this case I would suppose that an organic substance holds the NO_3 in combination, while the Ag combines with Br.

It is, therefore, to be recommended that the precaution should be taken of drying the crystallised bromide of cadmium until free from water before weighing it, because it usually loses a part of its water by efflorescence, when the bromine contents of crystallised bromide of cadmium, as calculated from the formula, does not agree with the actual contents. Then bromide of ammonia absorbs a varying quantity of moisture from the air, and should, therefore, be also dried before being weighed.

The ammoniac-cadmic bromide, which I described at more length on a former occasion, and which is much used in bromine emulsions, is quite stable in the crystallised, in air-dried, condition. It neither absorbs water nor gives any off by efflorescence; its bromine contents are always the same, and it may be weighed out and used for emulsions without any further precautions. To dry it is superfluous; indeed I rather advise its not being dried, since I have observed that at 150° C. the double salt loses a part of its bromide of ammonium, and that its composition then becomes less stable and likely to produce failures.

This salt should, therefore, only be dried on the water bath at 100° C., and not over an open, even if gentle, fire, as previously recommended. Thus the drying of ammoniac-cadmic bromide is not only superfluous but may be injurious.

I recommend this crystallised, spontaneously-dried salt as a bromide excellently adapted for emulsions. J. M. EDER, Ph.D.
—*Photographisches Archiv.*

NOTE UPON THE SOLAR PHOTOSPHERIC NETWORK, AND ON PHOTOGRAPHY REGARDED AS A MEANS OF DISCOVERIES IN PHYSICAL ASTRONOMY.

THE application of photography to astronomy has an importance which becomes each day more marked, and at the present time several branches are distinguished in this admirable application.

From its origin photography has been considered a truthful means of obtaining a durable record of any phenomenon, being free from all personal intervention. Here was already a very important field open to this new branch of science, and it was quickly recognised that the photographic image, when taken wlth the necessary precautions, might be used to obtain accurate measurements. It was thus that in the observatories of physical astronomy, already numerous on the surface of the globe, and of which the number increases each day, a series of images of the sun, the moon, and even of the constellations were taken, and because photography now attacks the construction of celestial maps there is every indication that it will obtain in this direction the most brilliant success.

In a few lines I shall not have the necessary space to fully treat of this recent progress, and still less to give the history of the important applications of an art born in France, and which we ought to strive and labour to maintain in our country in its greatest perfection; and I therefore only desire now to inform my readers of a new point of view of the application of photography, which is that of the astronomical discoveries to be obtained by its means.

After studying the facts of which I am going to speak, one can easily be convinced, indeed, that under peculiar circumstances the photographic image is able to reveal certain phenomena which would not be perceptible with the present instruments used for celestial exploration. I do not here wish, be it well understood, to allude to the photographic impressions based upon the intervention of ultra violet rays, which appear to have so feeble an action upon the organ of sight, and, on the contrary, so active upon whole classes of photographic substances. These phenomena are well known, and I have no need to speak of them here, where I have to treat of quite another subject.

Since its establishment in 1876, the Observatory of Physical Astronomy, not being yet supplied with great instruments for celestial exploration, has specially occupied itself with solar photography. The photographic telescope, constructed by the eminent optician, M. Prazmowski, for our expedition to Japan to observe the transit of Venus, has been very precious for these researches, which have been conducted not only from the point of view of the formation of a series of solar images giving the history of its surface, but more especially in view of the progress to realise in this branch of science the new and important one of physical astronomy.

Up to the present time solar photography, considered as a means of ascertaining the nature of the surface of the sun, has remained very subordinate to optical observation with great instruments. The negatives, of which the images were not greater than four to four and three-quarter inches, could not show the details of the photospheric structure, notwithstanding the study of the real formation of the photosphere is today indispensable if we wish to make progress in solar knowledge.

The study of solar markings or spots, which for more than two centuries and a-half have furnished nearly the only data upon the constitution of the photosphere, appears nearly worn out, or at least it must be sustained for the future by the study of the photosphere itself. Now, this study has only been aided to the present by optical observation, and it is well known how many difficulties this kind of observation presents.

The rareness of favourable conditions, and even the fatigue and danger, are not here the greatest obstacles. The principal circumstance which has hitherto especially opposed the success of these studies is the impossibility, in the midst of the incandescent photosphere, to well recognise the form of the granulations—the power of measuring them, especially to identify them, so as to follow their transformations. It is only near the markings and the little and obscure nuclei that attempts have been made to study the photospheric constitution, but these conditions are no longer normal.

The questions respecting the variations of structure which the different regions of the photospheric surface may show have not been even commenced. There was, therefore, a great step for science to make; and if photography could give images of the surface of the sun, and with details secured with sufficient sharpness to allow of such study unobtainable by the optical observation only, it is clear that a grand advance would be made in our knowledge of the sun, and the way would be prepared for the future precious elements for progressive discoveries. It is the solution of this question which has occupied me since I commenced my labours in solar photography.

Permit me a few words on the considerations which have guided me in my researches. In studying the conditions under which solar photographs have until now been obtained, I have been led to recognise that the principal cause which opposed the reproduction upon these photographs of the details of the solar surface was a phenomenon which may be called "photographic irradiation" (without in any wise prejudging its cause), and in virtue of which a photographic image when it is formed by a very brilliant light gives upon the negative dimensions larger than the reality. This phenomenon is very striking in all the photographs of total eclipses which have been obtained since 1860, and the images of the protuberances encroach upon the lunar disc by a quantity which exceeds sometimes more than ten or twenty seconds of the arc. It is understood that if the details of the solar surface—the granulations, for instance—are of an order of size inferior to the value of this irradiation, it becomes impossible to obtain them with any sharpness. Now it is known that the granulations have in general an average diameter of a second of an arc; and I have been able to see the irradiation attain, even by the very much more feeble light of the protuberances, a value twenty times more considerable.

It appeared to me that the solution of this difficulty was in the enlargement of the image, combined with a diminution in the time of the exposure of the sensitive plate to the action of the light. In this way there was a triple chance of success. On the one hand the irradiation diminished rapidly with the augmentation of the diameter of the image, especially if the period of exposure diminished at the same time. On the other hand, the dimensions of the details to be reproduced being augmented, such details ought to be obtained much more easily; while, finally, the imperfections of the sensitive film had less relative importance. But there is especially a circumstance which then becomes very favourable to the production of very precise images: I have recognised, in fact, that in very short exposures the photographic spectrum reduces itself to a very narrow band; that is to say, that the rays which then go to form the photographic image belong to a group nearly monochromatic. If it be considered that the visible spectrum is, on the contrary, very extended, it is easily understood that photography can give, under these conditions, images very much more precise than ocular observation.

It is true that photographic difficulties augment with the size of the images; but they may be surmounted with care and perseverance. Thus, since the commencement of these studies in 1874, I have constantly striven to obtain the solar images larger and larger, and the diameters of our images have been increased successively from four and three-quarters to six, eight, and twelve inches; at the same time, in increasing the dimensions, the formation of the sensitive film and the manner of the development of the negative was perfected. Upon these last points I will say that solar images demand a photographic process of very great perfection, and the least faults are revealed in all their crudity. As the details to be shown possess extreme delicacy, it is indeed necessary that the film should be without structure and of irreproachable purity. The cotton ought to be prepared at a high temperature, so as to give a film of great fineness.

The development of the image should be gradual—commenced with iron and terminated with pyrogallic acid with silver added thereto. I have been assisted in my photographic operations by M. Arents. The focussing must be rigorously exact. It varies with the season and even with the hours of the day, which is caused by the variation of the lens and the tube which carries it. In my instrument the ocular is movable, and its position is obtained by a circle finely divided.

The time of the exposure is regulated by mechanism, by which the regularity of the movements is rigorously obtained so as to secure an equal time of exposure on all parts of the image. The duration of the exposure ought to be extremely short. In summer the time of action for the images of twelve inches is comprised between $\frac{1}{2000}$ and $\frac{1}{3000}$ of a second of the direct light of the sun which falls upon the sensitive film without either being concentrated or dispersed by refracting medium.

It is the extremely short duration of the action of light which necessitates the slow and continued development; but then the image, free from sensible irradiation, appears with all the details and shows the phenomena with which we have now to occupy ourselves.

The photospheric surface has been much studied with the great optical instruments, and the study has led to the admission in the solar film of the presence of granular elements, but upon the form and dimensions of which learned men are not agreed. My readers will recollect the discussions which have arisen upon the forms resembling rice grains, willow leaves, &c. I will not continue this discussion, for photography has now served to solve the question. Thus, in the labours I pursue, and of which I give here only the generalities, I attach myself especially to the study of the negatives, which are for the future the documents most important to consult. My photographs show the solar surface generally covered with a fine granulation. The form, the dimensions, and the disposition of these granular elements are very varied. The sizes vary from several tenths of a second to three and four seconds. The forms resemble those of the circle and the ellipse more or less elongated; but frequently these regular forms are altered. The granulation shows all over the image, and it does not appear at first sight that there is a different formation at the poles of the sun. It will be necessary, however, to return to this point. The lighting power of the granular elements, considered separately, are very varied; they appear situated at different depths or levels in the photographic film—the granular elements the most luminous; those in which are contained especially the luminous power of the photosphere only occupy a small fraction of the surface of the sun.

But the most remarkable result, and which is due exclusively to the intervention of photography, is the discovery of the *photospheric network*. In fact, the attentive examination of these photographs show that the photosphere has not an uniform constitution in all its parts, but is divided into a series of figures more or less distant one from the other, and showing a separate constitution. These figures have their outlines generally rounded—often nearly rectilinear, and resembling polygons. The dimension of these figures are very varied. They attain sometimes one minute and more in diameter; while in the intervals of the figures of which I speak the grains are sharp and well terminated, although of a size much varied. In the interior the grains are as if half effaced, pulled out, and troubled; but most generally they have disappeared to make place for currents of matter which replace the granulations. Everything indicates that in these spaces the photospheric matter is under the influence of violent movements, which have confounded the granular elements.

I will not today touch upon the consequences of this fact, which enlightens us upon the forms of solar activity, and, as I have said some time ago, show that this activity in the photosphere is always very great, although it does not exhibit any mark at the surface. The photospheric network could not be discovered by any optical means which were directed at the sun; in fact, to observe it on the proofs it is necessary to employ a magnifying power which embraces a certain extent of the photographic image. Then, if the magnifying power be really appropriate, if the negative be very pure, and especially if it have received the full exposure necessary, it is seen that the granulation has not everywhere the same sharpness—that those parts of well-formed grains are disposed as currents, which revolve in such a manner as to circumscribe the spaces where the phenomena represent the aspect which we have described. Now, to corroborate this fact it is necessary, as we say, to embrace a considerable portion of the solar disc, and it is just that which is impossible to do when the sun is observed through a very powerful instrument, the field of which, by the very fact of its power, is very much restricted. In these conditions it may be stated that there exist certain parts where the granulation ceases to be sharp or even visible; but it is possible that this fact does not form part of a general system. Already the examination of the photographs extending over a few months show certain differences in the constitution of the photospheric network—differences which will instruct us upon the variations in the forms of solar activity.

I direct attention also to the very important fact placed in evidence in quite a special manner by the photographs—that of the very numerous and obscure prints shown in the regions of regular granulations, and which indicate that the photospheric film is extremely attenuated.

Thus solar photography is from the present moment placed in the condition that it reveals to us the most important facts connected with the constitution of the sun. It is a new method which opens itself before us, the results of which we can associate with those of spectrum analysis and the old optical observation, and to resolve definitively at last the important problems connected with the great luminary of the day. M. Janssen.

PHOTO-ETCHINGS.

In your issue of November 30th your article on the so-called photo-etchings exhibited by Mr. Gutekunst, of this city, directed special attention to the character of the collodion employed in their production.

Your experiments were evidently conducted directly on the collodion film—a method we consider impracticable, as no known sample furnishes a sufficiently structureless and adhesive film to procure satisfactory results. In our practice we employ no special collodion, and only the ordinary sandarac varnish as used on all negatives made in this establishment. For etching purposes the varnish should not be too thick, and preference ought to be given to a freshly-prepared plate, though we have worked successfully on old negatives, the varnish containing sufficient oil of lavender to retain its elasticity.

After sketching the design lightly on the negative, lay in the lights with crayon, india-ink, or any opaque material, and proceed to etch or scratch away such portions as may be desired, using a coarse needle and firm strokes for the foreground and strong shadows, and a finer point for the more delicate and retiring effects—hatching, cross-hatching, and knitting together, as it were, with irregular markings, and blending into the parts to be left untouched with a delicate stippling process, care being taken to avoid a patchy or wiry appearance. The successful manipulation of the print can only be attained by practice; and, although a careful study of good engravings will materially assist the student, yet an attempt to imitate their character would entail too great an amount of labour, and result only in failure and too harsh a contrast with the texture of the untouched portions of the negative.

As operator in the establishment of Mr. Gutekunst, my duties in the studio afford me but limited time to devote to this interesting branch, and the specimens exhibited were some of my efforts, made in spare moments and in most cases from negatives not specially intended for the purpose, the design being suggested by the character and pose of the subject.

Considerable tact and inventive genius may be displayed in arranging and adapting accessories and grounds to negatives on hand; but the beauty and value may be enhanced where a subject is posed and arranged for a fixed design, and in the hands of an intelligent operator very beautiful and artistic results may be achieved.

There is here certainly an immense field for the display of talent; and the process. in the main, not being difficult, with an unlimited scope, from the slightest alteration in a negative to the finishing of the most elaborate design, according to ability, we unhesitatingly encourage the attempt in any enterprising student whose taste may be in this direction. Wm. Osborne.

Philadelphia.

THE ART OF PAINTING ON THE PHOTOGRAPHIC IMAGE.

No. XVII.

Photographs may be very effectively treated with coloured crayons, and very rapid effects are got in this way. There are two distinct methods—one by the use of hard crayons, or *creta lævis* in wood; and the other by the use of soft crayons or pastels, as they are sometimes called. The latter are capable of producing very sweet and soft effects; but they are very liable to be damaged. Methods have been proposed for fixing them. One way was to apply some penetrating, glutinous solution to the back of the picture, intended to soak through to the front, and so fix the small particles of colour; another was to prepare the paper with a gummy solution, then paint upon it with the crayons, afterwards subjecting the surface to the steam from a kettle; and the third mode was to blow a sticky solution on to the front of a picture from a spray diffuser. But one and all are subject to the objection that they slightly sully the picture. The best way is to frame it at once when done, first seeing that the glass is securely papered into the frame by narrow strips running all round the edges at the back, and, when the picture is in the frame, pasting some waterproof material all over, such as thin gutta-percha or tinfoil.

If the hard or dry crayons be used they should be applied in cross-hatchings or stippling, or the two combined. Take an orange crayon and cross-hatch the darkest shadows with it, and between those may be stippled some warm maroon or Indian red colour. Next take a flesh-coloured one and cross-hatch all over the face. If a good photograph the pearly greys will now be found to have taken their place, and the medium shadows should be warmed up with a raw-umber-coloured crayon, just as if it were water-colour. Pound a small piece of greenish colour in powder; dip a piece of wash-leather into it and rub all over the background; then take various-coloured crayons and cross-hatch and stipple all over until a pleasing effect is got, applying the rules already laid down, which I need not repeat. The drapery should be treated in the same manner; but here, again, vignettes are the most suitable. The hair may have some appropriate colour now stumped over it, and then carefully lined to suggest the flow of the different portions of it, remembering that the lights are generally cold or neutral tinted, the deep shadows rich and warm, and the real colour of the hair most discernible in the middle tints.

Touch up the high lights on the face with a light buff crayon; put the carnation deftly on to the cheeks and lips; and, finally, mark out the nostrils, line between the lips, and put sharp touches about the eyelids, &c., &c., with a deep maroon crayon.

Next week I will endeavour to explain the soft crayon or pastel painting, and then for the present take leave of my indulgent readers. It occurred to me that some might wish to address me by letter on any part of my subject upon which I had not made myself quite clear, or in which they had met with special difficulties. Such readers I would refer to the advertisement columns of this and the next issue.

JOSEPH WAKE.

ON THINGS IN GENERAL.

THE New Year, with all its hopes and promises, has begun. Photographers by this time have made up their balance sheets for the old year, and reckoned up their profits and losses. That they may all have a big balance in the right direction I fervently wish, though if all I hear as I travel about be correct, the year that has just gone has been the worst for a long time past in a commercial sense, except to the process-mongers, and to them I opine many have despairingly fled in the hope of drawing clients by the latest thing out.

Instantaneous photography is not yet accomplished, though I see that with the kindness and generosity becoming the season a gentleman who has made a noise in the photographic world for the last twelve months has reduced the price of his apparatus designed to this end. I don't know whether the Editors will put a veto on this paragraph on the ground of its being an unpaid advertisement; but with the new year I am informed that the renowned Scotellari apparatus can be had at the reduced price of thirty shillings. Of course it will now be in the hands of every-one!

I see the powerful pen of a well-known provincial photographer has been at work to prove that—really it is rather difficult to gather *what* from his flowing periods and classical style—however, I may translate him by saying that three things are bad—too much retouching, too much background, and absence of expression. Photographers cannot be too much obliged for the information thus prominently given:—"Away with levellers and French polishers," I further read. I never before heard of the term "French polishers" applied to photographs, though it could be very appositely done to that class of pictures of which this gentleman is the redoubtable champion—the highly-glazed carbon pictures. As this, however, cannot be his aim, I can only imagine it to be a sly hint at one of his professional rivals who, if reports may be believed, was at one time connected with the French polishing interest. I cannot admire the taste displayed if this be the *motif* of the expression.

I have found much to amuse me in the correspondence columns of late. What a perverse fate it is that constantly impels the Autotype Company into defending its actions in print! They don't deserve it; but they are quite able to hold their own, and he who crosses swords with them needs to put forth all his skill. One gentleman was not "let down softly" by them in their last communication. I must, however, say that their idea that "it does not seem an extraordinary flight of imagination to broach the idea of a second coating of pigment, seeing that a sheet can be once coated," savours rather of the egg that Columbus made stand on end. However, pigment printing is now well to the fore, and I wish it every luck. A good deal has been said of late, in connection with carbon printing, of the use of alcohol in the bath; wherever it is used it is to be hoped that such samples may not be come across as appear to be found in the north, where, as I learn from the report of the Glasgow Photographic Association, fusel oil is sold in place of methylated spirit. It is a very remarkable exchange, but not near so remarkable as the manner of doing business on the continent, where I gravely saw put into print a week or two ago that such goods, for instance, as chocolate were sold by the kilometre. Fancy in England a shopkeeper asking whether you would have a mile or half-a-mile of chocolate!

Among other things of note I have read that some of the German *savants* have discovered that when transparent parts of the negative were worked upon with a pencil further detail would frequently make itself apparent. I should have thought that that was the object of the alteration; however, they manage these things so much better abroad!

America must come into the category of "abroad," and one of those things they manage so well there is the saving of residues—at least so from an article in the *Philadelphia Photographer* one is given to understand. The writer says that "most proprietors of galleries are disposed to practise saving, but the difficulty is in getting 'helps' to look after their employers' interest in this direction when it requires a little more care and an extra step to do it." That is all right and good so far, but he goes on to say that the best plan for all concerned would be to make those who handle silver interested in saving by giving them a percentage on all they save. Now I am afraid that those men who would throw valuable residues down a sink to save the trouble of taking a step, would not hesitate now and then to put a sly ounce or two of silver into the receptacle to increase the amount of their percentage.

In connection with nitrate of silver I have read one of the strangest communications I ever looked at. The writer is grumbling at the high price of ready-sensitised albumenised paper, and thinks it ought to be sold for less, proposing ten shillings and sixpence as a suitable charge. He estimates it to cost nine shillings, and this, he says, would leave a profit of one shilling and sixpence for labour. What he means by a *profit* to go in paying for labour is beyond my comprehension. No allowance in his estimate is made for rent, and the profit—fourteen or fifteen per cent.—is truly very moderate. The Editors of the Journal very kindly declined to print his effusion *in extenso*, and hid its absurdities in three or four lines of "Answers to Correspondents;" but others have not been so kind, and the whole tissue of his absurdities is gravely paraded by them for all to deride.

FREE LANCE.

STRAY THOUGHTS ON THE EXHIBITION.

[A communication to the Photographic Society of Great Britain.]

UPON these walls have recently been seen specimens of the results of one of the most wonderful operations of nature that we, who live in the present epoch, have been privileged to discover and make known; and, unlike most other discoveries which arise from scientific investigations, this one, from the moment of its birth, became closely allied, as a matter of necessity, with one of the emotional faculties of the human mind, viz., the pleasure arising from pictorial representation, and thus were brought together in a perfectly new combination, to be for ever united, emotional feeling and scientific fact; hence we designate our work the art-science of photography.

And whilst so much has been said respecting the claims which photography has made to be admitted into the temple of fine art, it would be as well just to arrive at some definition of the capacity which this art-science possesses for the production of pictorial works. I think it will be admitted that, in fine art, the materials are so plastic that they follow and obey the also plastic emotional feeling which guides their use, and hence, in fine art, an imitation is something independent of, and different from, the sentiment of the object imitated. In photography the materials are not plastic, being unyielding scientific facts, which, in their working, are not subject to plastic emotional feeling, and hence an imitation is a something dependent upon, and cannot differ from, the sentiment of the object imitated.

Assuming this proposition to be correct, it will be evident that the results in each case must always have a separate individuality, and so should not be brought into comparison with each other. It is as well to have some definition, such as this, strongly impressed upon the mind, because, if the actual capabilities of photographic art are clearly understood, I think we should hear less of that spirit of condemnation which delights in looking down upon photographic results from the high standpoint of fine art, as if the two were identical, instead of being quite different; for photography is a new pictorial power, which, although requiring artistic cultivation for carrying out its highest aspirations, can never come into direct contact with fine art, by which is meant that it starts as a new and distinct phase of art. Photography runs its own separate course, and so must be judged entirely on its own merits.

Having thus cleared the way by stating my views of the capabilities of photography, I now propose to see whether, from a study of the pictures that have been exhibited, any lessons can be gained which may, in however slight a degree, help forward the artistic side of our art-science.

In looking at a collection of pictures, where absolute nature has been the model, one cannot help being struck with the singular fact of the more or less absence of abstract beauty, and this applies with most force to the human face. Why should this be so? One would have thought that where it was the intention to produce a picture it would be the main desire and object to secure such models as possessed in themselves beautiful forms. I cannot see why, with the knowledge which everyone has of the impossibility of the scientific portion of our work being able to alter what is given it to do, better, if not perfect, models are not selected. Possibly it may be that abstract beauty, when photographically depicted without some kind of expression, becomes devoid of interest, and this leads into another phase of our work, wherein it differs from that of the painter, viz., that the photographic art student has to bring into play a moral power, which works by influencing and bringing out of the model the mental, or rather sentimental, expression which the subject is intended to convey. This, of course, implies that the model is capable of enacting the part; at the same time there is room for much skill and judgment in deciding when the expression is evident, and it is just the possession and cultivation of this faculty, in conjunction with a knowledge of the laws which govern art-composition, which will determine the ultimate art-value of the work done.

Then, again, in the composition of the leading or prominent lines of a picture there is too often the absence of beauty—not so much in this instance the absence of beautiful form as a want of knowledge of some of the simplest or elementary rules of fine art, the result being that the educated eye becomes irritated, and cannot derive pleasure from other qualities in the picture which may possess value.

Too often we found that the head was placed in a position completely perpendicular in relation to the body. This almost always suggests a want of purpose in the object; but there were many works exhibited where great attention had to be given to this matter, and the result was a pleasure to the beholder, arising from both the artistic faculty and the mental sympathy being satisfied.

Another thing was the tendency to place figures too low down on the space apportioned to the picture. No doubt this arose from our scientific facts being found somewhat difficult to be made subservient to artistic requirements; nevertheless, the result was not pleasing, the balance of parts and quantities not being satisfactory; and this leads to a most important section of our subject, viz., the subordination of one part to another. Now, this is one of the most difficult things in photographic art. We either see the entire surface of a picture rendered with equal minuteness, or else some parts so glaringly deficient in outline that the result is not in artistic keeping, and, consequently, does not give pleasure; also, why should it not be possible to arrange the component parts of a picture in its light and shade, so that we could have one extreme dark and one extreme light, all the rest being in proper gradation of tone? In other words, not the absence of sharpness, only the placing of it in its right position as to retiring or coming forwards. Something of this kind has been attempted where backgrounds, occupying a large portion of the picture, have been made dark, or in comparative gloom; but this is not satisfactory or in keeping, because it frequently has the effect of making the figures appear as if taken when the sun shone direct upon them, whilst the background and accessories were taken without the sun shining at all.

In the exhibition were some works which afforded excellent examples of what I have endeavoured to explain, viz., subordination of parts. I refer to some specimens of mechanical printing—the originals being engravings from paintings—which very decidedly possessed all the attributes that I think ought to be attempted in photography. And it is from engravings and reproductions in black and white that photographers can gain many practical suggestions, by a careful study of the light and shade which such works so clearly reveal to us.

One very singular fact must have forced itself upon all who were capable of being moved by pictorial expression—that as photographic records of the human face must so decidedly reveal what is passing in the mind of the model at the moment, unless the exact expression desired is portrayed, what is done may not only be just something else, but also may really look like some inanimate object which has no capacity to express anything; hence the picture presents an anomaly, inasmuch as the figures appear to have got into the wrong place and mean nothing.

This matter involves on the part of the photographer a peculiar faculty—that of reading character and determining the exact moment when the model, having responded to his influence, appears to him to express the sentiment he wishes, and here again is met one of the great difficulties in the way of the photographer who aspires to depict any incident of an emotional nature; he has to choose models who not only may look like and enact the character to be portrayed, but who also must be subject to the sympathetic influence of the art operator in working them up to the desired expression.

The difficulty of securing models, more especially where several figures are required, makes it a matter of necessity that several negatives should be employed to make one picture. This, which is called composition photography, requires so great an amount of manipulative skill in the subsequent joining together of the separate parts for each individual copy that it would almost appear not to be the way by which future works can be produced. However, when the capabilities of the flexible materials which we have now at our command for making negatives are well understood, and which seem from their very nature admirably adapted to the requirements and necessities of composing one picture from many parts, let us hope that a new era will dawn upon us, and that we shall see the walls of our exhibition well covered with pictorial effects which will raise the status of photographic art in the estimation of the picture-loving portion of the world.

Naturally, as an artist and painter myself, I look at the art side of our work with more interest than at the scientific; because at a public exhibition it is the emotional faculties we appeal to, and success must depend upon the amount of interesting works we submit to this feeling, which leans to the pleasurable rather than to the instructive. And hence it is I see that photography, being a new pictorial power, must in future be taken up by those who, cultivating their artistic faculties to the greatest extent, will make their works not only take rank in photographic status from their own inherent art completeness, but also supply the evident want of the age, viz., pictorial works which illustrate the various phases of nature in its human interest, and which, from the necessity of their always presenting *facsimiles* of what has been in existence (and the originals, therefore, capable of feeling the sentiment shown) must command the sympathy of all who can respond to what is evidently true, and thus our art-science will fulfil one of its missions in conferring pleasure upon mankind. EDWIN COCKING.

FOREGN NOTES AND NEWS.

PHOTOGRAPHY IN SWITZERLAND.—THE TRANSPORT OF COLLODION IN AUSTRIA AGAIN.—DR. VOGEL'S TRAVELS.—DR. HUSNIK'S TRANSFER PAPER.—COMPARATIVE EXPERIMENT WITH COLOURED SCREENS.

THE *Photographisches Wochenblatt* has a letter from a Swiss correspondent giving an account of the condition of photography in Switzerland, from which we learn that trade is dull there at present as well as everywhere else, and that an attempt made to found a Swiss photographic journal has failed completely, as has also a petition to the Bundesrath for a law to protect the possessors and producers of original photographs against unauthorised reproductions. The proposed law of copyright was similar in substance to the new German law which has just come into force. In Switzerland photographers devote themselves almost exclusively to portraiture, the exceptions being a pair of landscape workers, who own flourishing studios at Geneva and Lausanne, while carbon is entirely neglected, the public showing little interest in that branch of the art-science. There is, however, one establishment near Zurich where licht-drucks are produced, though it has been but recently started.

At Zurich or Berne an enterprising portraitist announces that one fine day he threw all his head-rests out at the window, and that he has ever since worked without them, to the great comfort and satisfaction of his sitters.

The oppressive restrictions that hinder the transport, in Austria, of collodion cotton by rail is the subject of a long article in the current number of the *Photographische Correspondenz*; but the subject is not of much interest to British readers, and has, besides, been already touched upon in these columns, so that a passing mention is sufficient as long as no definite result has been obtained by the ventilation it has already received.

The *Photographischen Revue* speaks highly of an account by Dr. Vogel of his travels in the four quarters of the globe, published under the title of *From the Indian Ocean to the Land of Gold*, and forming a volume of the *Scientific and Literary Library* (*Bibliothek für Wissenschaft und Literatur*) of Theobald Grieben.

In the *Photographische Correspondenz* an extract is given from a letter of Professor Husnik's on the best way of using his photographic transfer-paper. It runs thus:—

"It often happens that one has not time to transfer at once to the final support a fatty picture developed on Husnik's transfer-paper, or that in the course of the day one has still a number of similar pictures to finish, so that it is not until evening or the following day that one has time to transfer them to stone or metal. In such a case it is best to remove all superfluous water from the pictures by means of blotting-paper, and then to let them become quite dry. When ready to transfer them place the pictures for a short time in damp and treat them like ordinary prints. In this way the press can be screwed up tighter at the beginning, and the success of the transfer is much more sure than when this operation is undertaken with the still fresh and softened paper pictures."

M. Durand, of St. Etienne, in the *Moniteur*, gives an account of some experiments made in conjunction with M. Blachon, with various descriptions of coloured glass and paper used as non-actinic screens for the illumination of the dark room. As the trials were made with the object of finding a coloured screen sufficiently non-actinic for use with rapid emulsions, the tests were applied to ordinary gelatine plates, and the following examples were transmitted to the editor of the *Moniteur*:—No. 1. A positive obtained by exposing a plate (in contact with a negative) for twenty minutes to the light of a taper protected by an *Appert* coloured glass. The image perfectly visible. No. 2. A positive obtained in the same manner and with a similar exposure, but substituting for the taper a lamp, the light of which was turned down pretty low so as not to have a too powerful light. The result was a positive scarcely so vigorous as No. 1. No. 3. Exposed for one hour to the light of a taper, surrounded by a sheet of non-actinic paper, prepared with chrysoïdine by Professor Stebbing. The result showed no trace of an image. No. 4. Exposed for twenty minutes to a taper protected by a bell glass, both sides of which were covered with a somewhat uneven coating of varnish, holding in suspension finely-divided chromate of lead. No trace of an image was visible. It is remarked that the light obtained with this screen possessed greater powers of illumination than any of those already mentioned. No. 5. An exposure of forty minutes under the same conditions of light as the last produced a distinct image, but M. Durand is of opinion that had the coating of varnish been *more regular* this result would not have occurred. The conclusions at which the author arrives are as follow:—1st. It will be prudent *not* to employ the *verres Appert* for gelatino-bromide plates, as they are not prepared for use in emulsion work. 2nd. That as far as we can see at the present time, except perhaps in the case of extra-rapid gelatine plates, we are perfectly safe from fog in using the chrysoïdine paper. 3rd. That the chromate of lead varnish, while not offering the same security as chrysoïdine, has the advantage of giving, from the same source, a better and less fatiguing light. We may remark that the *verres Appert* spoken of are made of three different densities for lamps, gas, or tapers respectively.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Jan. 31	Liverpool Amateur	Free Public Library.
„ 31	Oldham	Hare and Hounds Inn.

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

The ordinary meeting of this Society was held at the Odd Fellows' Hall, on Monday, the 7th inst.

The minutes of the previous meeting having been read and confirmed, the members proceeded to the revision of the rules, which occupied nearly the whole of the evening.

A number of cloud negatives on waxed paper, the production of Mr. W. Perry, were exhibited by Mr. Greaves, and were much admired, being considered good examples of cloud work.

A patent filter, to be attached to the water tap, was exhibited by Mr. Sachs (for Mr. Berlon, of Bradford, the agent for the patentee). The filter was a remarkably neat and compact piece of apparatus, very ingeniously constructed. It acts either as a filter, or as a tap, a simple half-turn of the screw being sufficient to effect the change. It appeared to be well adapted to the requirements of a photographer or carbon worker, to whom a supply of water free from solid particles of matter is of considerable importance. Much admiration of the useful little contrivance was expressed by several of the members.

The meeting was shortly afterwards adjourned.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

An ordinary meeting was held on the 6th ult.,—Mr. John Carbutt, Vice-President, in the chair. The minutes of the last meeting were read and approved. The corresponding Secretary reported that he had sent the names of officers to the Editors of The British Journal of Photography. Mr. Samuel M. Fox was duly elected a member. The certificate of centennial stock belonging to the Society was placed in the hands of the Room Committee to be framed.

Following a motion to that effect it was resolved to send the transactions of the Society to The British Journal of Photography for publication.

Dr. Seiler exhibited some prints, showing the great latitude of exposure admissible with washed emulsion dry plates.

Mr. Bates exhibited a very convenient hot water apparatus for drying plates, so arranged that it could be kept at a uniform temperature by a spirit lamp or gas-burner.

Mr. Corlies laid upon the table a number of prints, presented by Dr. McQuillin, illustrating various scenes in British Columbia. It was resolved that a vote of thanks be tendered to Dr. McQuillin for the donation.

Mr. Zentmayer exhibited an interesting collection of prints by Mr. Robert Beneke, of St. Louis, Mo., showing various stages of progress in the construction of the bridge across the Mississippi River at that place. These views were made with the Zentmayer lens and were considered fine examples of photography.

Mr. Corlies exhibited a number of successful prints from washed emulsion plates.

Mr. Browne called the attention of the Society to a substance now used by surgeons instead of lint, and which he had found useful in many photographic manipulations; it was similar to a *very* heavy and porous blotting-paper, and was capable of absorbing a large amount of water or other liquid.

The Secretary exhibited samples of his summer's work, showing a print from every plate exposed during the season, illustrating the certainty with which washed emulsion could be worked.

The meeting was then adjourned. D. Anson Partridge, *Recording Secretary.*

BERLIN PHOTOGRAPHIC SOCIETY.

This Society met on the 16th November, 1877,—Dr. Vogel occupying the chair as usual.

Herr Prümm exhibited a number of lichtdrucks by Herr Hoffmann, of Dresden, amongst which may be mentioned a large sheet containing the portraits of the 363 republican members of the French Chamber of Deputies. Of this it was intended to print 100,000 copies, but the printing was discontinued owing to the first edition of 30,000 copies having been seized at the frontier by the French Government. A number of other articles were then shown, including a Scotellari lens shutter, constructed by Herr Reichard. Herr Prümm remarked that an ordinary shutter could be used for after-lighting, its inner surface being covered with velvet. It is held at such a distance from the negative as that sufficient light is reflected into the camera to produce the desired after-lighting.

The President then presented the guest of the evening, Mr. L. Warnerke, of London, to the meeting, and spoke of the services rendered to the dry-plate cause by that gentleman.

Mr. Warnerke then made some most interesting remarks, illustrated by his showing a number of articles which need not be enumerated here, as they are, doubtless, well known to the readers of The British Journal of Photography.

A vote of thanks to Mr. Warnerke for his interesting communication was then passed.

Herr Schwier exhibited a number of pictures produced upon ground glass by the sand-blast process. They were reproductions of woodcuts and patterns upon flashed glass having a white ground. There were, further, ornamental borders for carbon prints, which were then subjected again to the sand blast, the parts of the glass covered by the carbon picture being protected from the sand while the interstices were still exposed to its action. The process, as patented by Herr Schüler, is as follows:—A sheet of glass is ground by the sand blast, and then etched with fluoric acid. A carbon picture is now transferred on to it, after which a second blast follows. By this means the already ground parts are strengthened and the covered parts retain their fine grain.

A discussion followed, the subject of which was introduced from the question box by the query—"What would be the best plan for the construction of a glass house upon a piece of garden ground measuring about five metres from east to west, and ten or twelve from north to south—about fifteen or twenty metres to the north of the proposed site there being houses of two stories in height, while the floor of the studio itself must not be raised more than one metre above the ground?" The querist was recommended to make the glass walls of his studio face the north or north-east.

On the termination of the discussion the meeting was adjourned.

Correspondence.

STEREOSCOPIC TRANSPARENCIES.

To the Editors.

Gentlemen,—Will you favour me by inserting in the next issue of The British Journal of Photography the following remarks on Mr. Oakes's paper about Mr. Breese and his transparencies, which appeared in the number of the 18th inst.?

He states:—"No living man besides myself" possesses the whole of Mr. Breese's *modus operandi.* This is a great mistake, and if Mr. Breese led him to believe such was the case he committed an act of injustice towards Mr. Oakes, one or two others, but, above all, to myself. This I feel anxious to remedy by publishing a few facts.

From the autumn of 1865 until July, 1866, Mr. Breese was in partnership with Mr. J. Robinson, to whom he imparted sufficient knowledge to enable that gentleman to undertake the entire management of the printing and combination department, which he did for the time being. As the commercial prospect, and one or two other matters not worth mentioning here, did not satisfy Mr. Robinson the partnership was dissolved; and, on the condition that the money deposited by him should be returned, that gentleman consented to be bound in the sum of one thousand pounds not to divulge nor practise anything appertaining to the business or the process. I state this because I think it probably accounts for his silence and loss of interest in the matter. I have reason for believing he is now living in the vicinity of Birmingham.

Prior to this a Mr. Fred. Sutton was with Mr. Breese for a short time. After he left he was very much heard of in trying to monger what he knew to many photographers in this country.

Now for myself. I entered Mr. Breese's employment, as a sort of an apprentice, on the 6th of December, 1865, and was with him almost daily until the break up of his home and removal to Sydenham in October, 1868. His brother-in-law, Mr. W. Stockil, then took his affairs in hand and started the concern of Breese and Co., with myself as deputy-manager to Mr. Breese. For the greater part of this time we were quite companions, and latterly, as Mr. Breese's failing health (arising from softening of the brain) required close attention, he was, to all intents and purposes, under my charge. This state of affairs continued till the death of Mr. Stockil in March, 1872, when the business of Breese and Co., from the failing interest on the part of the public in stereoscopic work, both of the specially good and the inferior class, not being a commercial success, the studio, plant, and effects came under the hammer in the June or July following. The whole was disposed of, except a complete set of apparatus and the negatives—the latter in consequence of not being able to get a fair bid for them. It was at this time, through unpleasantness, the great trial I had with Mr. Breese took place, and owing to this, combined with failing health on my part, it became necessary for me to separate myself from the concern in order to secure a thorough change. Since then I have had neither time nor inclination to take up the subject, and had deferred publication till some transparencies had beeu produced on my own account to add more force to anything I might have had to say.

While my pen is engaged on this subject I may as well give my version as to what constitutes (as Mr. Oakes puts it) "the pith of the matter." This is the principle on which combination printing for the stereoscope is performed:—The principal pieces of apparatus necessary are a binocular copying camera, and a good tin or other simple form of lenticular stereoscope open at the bottom. The camera should be fitted with twin lenses, and the usual partition to divide the two pictures both in the portion of the camera before the lenses and also that behind. The front carrying lenses must have, besides the rising motion, a means for varying the distance between the lenses, to bring them nearer together or remove them further apart, as circumstances may require. A right- and left-handed screw motion worked by a milled head from the side is most convenient; but rack-work, or any other contrivance which will do that, fully answers the purpose.

The camera retained for Mr. Breese, by his desire, was supplied by Mr. J. H. Dallmeyer, and fitted with a pair of that gentleman's "new stereoscopic lenses," the means for separating them being the right-and left-handed screw movement—suggested, I believe, by Professor Emerson, of Troy University, during the controversy on how far the two lenses of a binocular camera should be asunder. An extra home-made sliding body was fitted to the camera, and a suitable box divided into the two partitions necessary, with an opening in front for the negative and two at the back for the lenses to enter. This was arranged on a board, to the front of which was hinged a frame holding a cast slab of plaster of Paris, the slightly yellow colour of which was corrected by the addition, when in the liquid state, of French ultramarine and a little of Judson's magenta dye. This diffuses the light splendidly for transparency printing.

Now for the principle, which I will try to put in as simple a form and in as plain English as such an abstruse subject will admit of:—If a stereoscopic slide be taken and the interval measured which separates two corresponding objects in its foreground, one in each half or picture of the slide, then the same be done with two objects in the middle distance, and likewise with two in the extreme distance, it will be found that every measurement increases in length—that of the extreme distance being longer than that of the mid-distance, and this again longer than that of the foreground, every intermediate grade of distance having an interval proportionate to its position to the points taken for measurement. To make the matter more clear:—If a line were drawn from a certain point of a tree stump or other object in the foreground to some definite point in the extreme distance on one half of a paper stereo., and a similar line were drawn between the corresponding points on the other half, the lines, instead of being parallel, would diverge, the two pictures really diverging from their foregrounds into their distance. To put in any figure or other object the interval separating the stereo. figures would have to be hit exactly with that of the points on which each one was to be placed, or in the stereoscope a curious effect would result. Pseudoscopic effect is caused by the exact reverse of the above—the lines converge instead of diverge. If the lines were parallel superscopic effect would be produced; that is, no appearance of solidity or distance whatever.

I will now apply this, and see if it cannot be made elear why we see solidity, as well as the other two dimensions, in stereoscopic pictures. It is now well known that in viewing an object with a pair of eyes the two retinal impressions only coalesce at one point at a time. The rapidity with which the eyes are moved about from one point to another, the persistence of optical impressions, or the time they require to become perceptions on the brain, together with judgment acquired by habit, prevent us from seeing all the other parts of the view double unless we have given ourselves a special training for its observance. To enable us to see any point of a near object clearly we have to converge the optic axes, or, in homelier language, turn the eyes inwards till a line drawn through their centres intersect at the point viewed. For a point a little farther off the convergence is lessened, this convergence being more or less as the point looked at is nearer or farther away. This takes place within the limits of our capacity to judge or appreciate distance.

This is just the performance the eyes go through in the stereoscope in the rapid survey of the two dissimilar images. The near objects being nearer together, as explained above, require greater convergence of the optic axes to unite the two points viewed into one—the more remote ones, being farther apart, requiring less. This constant alteration in the lines of visible direction, with the accompanying fluctuation in the length of interval between the centres of the two retinæ, the brain interprets as distance and solidity. Anyone who wishes to go further into the matter had better go to the fountain head from which Mr. Breese drew his knowledge, viz., Sir David Brewster's works on the stereoscope and binocular vision, or to Sir Charles Wheatstone's papers published in the *Philosophical Transactions* of the Royal Society, and Professor Helmholtz's works on *Physiological Optics*.

Now for the application of the above in the construction of a stereoscopic combination picture:—Suppose it be required to make a moonlight effect: two stereo. negatives will be necessary—one a negative (say) of cloud effects taken with the sun in it; the other a negative of the moon, its position on the plate corresponding as nearly as possible with that of the sun on the other. Attention to this will save trouble. If the Sun's light were very strong he would leave a tolerably clear patch in the positive transparency; if he were partially obscured, or his light weak, as in early morning or late in the evening, his limit would be well defined. Either case would not involve much trouble—the latter rather more, perhaps, because if the moon were taken with the same lines as the cloud effect it would require to be slightly enlarged to exactly fit the place occupied by the sun's image. But as there is nothing on the moon's negative but its image the operation is not a very difficult one with the aid of a magnifier.

When the negatives have been procured the next thing will be to put that of the clouds into the front carrier of the copying camera, *face outwards*, arrange its position on the focussing-screen (about 2.6 or 2.7 inches between two similar objects, one on each foreground), focus, make a transparency, dry, and varnish. Now take out the cloud negative and put that of the moon into its place, but *face inwards*. The camera slide, with its shutters opened, holding the transparency, *back inwards*, is to be put into its place in the camera till the operation of getting the moon right for size and position in it has been performed, which—with the means for enlarging or reducing that the camera should afford, and the rising, lateral, and dividing motion of its lens-carrying front—should not be very difficult of accomplishment. When this has been so far completed that it appears near the mark to the unassisted eye, view with the stereoscope for the purpose of ascertaining whether the moon is right for distance. Very likely, after all the care and trouble taken, that interesting object will appear almost on the tip of the nose, or an infinite distance in space.

The application of the principle elucidated above requires that the moon should be just the distance apart, or, perhaps, slightly farther, than that of the clouds where they are to appear. If the moon appear too near, separate the lenses slightly. The stereoscope will show, while this is being done, the extraordinary phenomenon of a moon travelling through space at a terrific rate. If too far, move the lenses nearer together. A few trials will soon give the moon its proper distance. Focus on the proper screen, try the moon again for distance, &c., make a transparency, which must be of medium strength, dry and coat with a ground-glass substitute, a little wax dissolved in amber varnish being about the best I know, and was the only one used by Mr. Breese. Some narrow strips of thin cardboard must now be gummed round the surface near the edges of the moon transparency; it is then ready to have that of the cloud effect superposed upon it. If the work have been accurately performed the two may be fixed at once; but, if the moon be too near or too far, cut a thin strip out of the centre of the upper glass, and approach or separate the two parts till the result is satisfactory; fasten securely with strong gum-water, and then put under slight pressure to dry.

What has been said about the production of a moonlight effect applies equally to the combination of clouds with landscape, the introduction of figures, &c. Greater care must, however, be taken that both pictures, or sides, of the clouds and landscape are identical in size, otherwise another curious effect arises. More, however, about this, as also the production of distance in the stereoscope between the birds of a flight which have been drawn upon, and photographed from, a plate of finely-ground glass or paper. These, although drawn in one plane, may be given the appearance as though one bird is leading the others, with an interval between each, towards the observer.

It was really for this principle that, some time during 1866 or 1867, an eminent Paris firm offered £50 or £100 each for two of Mr. Breese's negatives, viz., *The Lonely Shore* (No. 12), and *Queen of the Night* (No. 42); for the condition was that instructions should be sent how to print them. The former was not a combination picture. This proposal, I believe, emanated from M. Levy himself.

If the foregoing remarks be not sufficiently satisfactory to Mr. Oakes to induce him to modify his assertion and extricate himself from the false position it places him in, I will undertake to give him in detail the means employed for the production of any of the eighty-six or so subjects Mr. Breese published after this fashion, taking the famous *Sea Gull* (or "gull" picture it ought to be called) picture first. The sea view portion of this was taken on the south coast, near Bridport. The gulls were stuffed ones, and with their wings outstretched were strung up and photographed, while slightly in motion, in the garden. The clouds were taken from a bedroom window near Birmingham, the combination of the gulls with these, and putting them over the sea, being effected in the copying camera. One more instance—73, I believe, was its number:—This, again, is a sea view with a very heavy cloud shading the forepart of the sea, the light shining down from the clearer sky beyond upon the distant water. The gradually-increasing light from the heavy shadow into the distance was obtained by using a softened edge shade; but, then, a streak of light was wanted along the horizon to represent the direct sunlight shining there. Four picked hairs out of a camel's hair pencil supplied this want. Two of them, with their butt ends together, were embedded in copal varnish on each half of the negative just where the light was required. When this slide was carefully printed the effect was really very beautiful. A storm appeared to be passing overhead, enveloping everything in gloom. Just beyond the sea reminded one of a glorious summer's day, the scene glowing with light and warmth.

Mr. Oakes's description of Mr. Breese's method of colouring the lustre picture is not correct. The original work was not performed in such a haphazard manner, as Mr. Breese well knew that in viewing prisms, of which a lustre is composed, every slight change in the angle of view must of necessity produce a different colour, while the laws governing the dispersion of light remain as they are. He, to ensure the representation of the colours being natural, in painting the slide copied the lustre while viewing it from the point from which it was photographed, that object remaining on the mantel-piece with the conditions of light the same as when it was taken. He then looked at it alternately with the right and left eye, putting a touch of colour on the right-hand picture the same as he saw in the lustre with that eye, doing likewise with the left eye and its picture till the slide was finished. This, of course, accounts for the overlapping of the colours arising from the difference of angle being so small. The colours used were of the transparent kind, such as Italian yellow, Prussian blue, crimson lake, emerald green, &c., thoroughly ground in turpentine, and worked in a vehicle of copal varnish.

If you can find the space I may, as opportunities arise, jot down a few details respecting printing, toning, &c. I may also have something to say about photographing moons, clouds, &c., and will probably go through the process which resulted in the production of the fine slide of *The Conjunction of Venus with the Moon*, which caused so much surprise many years ago. This was a veritable photograph of the moon and star, and was believed to be at the time it was first exhibited the only star ever photographed.

Just a few words on another point. I wish to enter a protest against the use of an expression hackneyed in photographic literature. Mr. Oakes has given its substance in the following words:—"I should not be at all surprised if some one crops up in future who knew how it was done all along." Much has been said about raising the social status of photographers; but how can this be expected while one brother of the craft does not scruple to impute falsehood and meanness of a most despicable description to another? Such, in my opinion, outsiders would take as the meaning of the words quoted. If I, from illness or any other cause, had not seen Mr. Oakes's paper, how unjust the application of those words would have been to me when I made myself heard on the subject of transparencies. While we are constantly hearing of two or more investigators arriving at the same conclusion independently of one another, almost by the same means, it behoves us to be very careful how we suspect another of appropriating our ideas, or to make the assertion that we stand alone in any sphere of thought.—I am, yours, &c.,

Wick, near Arundel, January 21, 1878. JOHN HARMER.

IMPROVEMENTS IN CARBON PRINTING.

To the EDITORS.

GENTLEMEN,—Under the above heading Mr. J. R. Johnson contributes an article to your valuable ALMANAC, just published, in which he has made a statement, as a quotation from memory, so widely different from the facts that I must beg you to do me the favour to call the attention of your readers to it.

Mr. Johnson begins by stating:—"In the last or one of the later editions of the *Manual* of the Autotype Company it is stated that while carbon prints are 'undoubtedly permanent, when permanent colours are employed for the production of the pigment paper out of which they are formed, yet, if it be desired to *obtain the tints yielded by silver and gold*, recourse must be had to pigments formed from cochineal, and that such prints are no more stable than the pigments themselves,' or words to that effect, for the *Manual* is not before me." The whole of the passage between single inverted commas is given by Mr. Johnson as a quotation from the last or one of the later editions of the Autotype *Manual*. With what right or justice Mr. Johnson prints in your ALMANAC, where it could not be immediately answered, a statement so utterly untrue, the following quotations shall show:—

The only editions in which anything like Mr. Johnson's quotation appear, are the fifth, published in 1876, and the sixth, published in January, 1877. In the fifth edition, page 83, is the following passage:—"All the range of photographic tints produced by gold toning can be obtained in pigment prints, and of undoubted permanency; if more than these are required it may involve some slight loss of that permanent quality which is the very essence of pigment printing."

Here it is specifically declared that all the range of photographic tints produced by gold toning can be obtained in pigments of undoubted permanency. Compare this with Mr. Johnson's misquotation "that if it be desired to obtain the tints yielded by silver and gold recourse must be had to pigments formed from cochineal."

In the interval between the publication of the fifth and sixth editions of the Autotype *Manual*, M. Lambert appeared, and introduced that rich purple tissue known as "Lambertype tissue." This being a colour of extraordinary brilliancy, could not at first be produced without the employment of cochineal colour, and is thus referred to in the sixth edition of the *Manual*, page 82:—"Up to a very late period, the more brilliant tints in the autotype tissues could not be obtained except by the use of cochineal colour." The article goes on:—"After many efforts and failures, the Company have at last succeeded in employing the active colouring principle of madder, and by the time this *Manual* is in the hands of the public they hope to be in a position to supply tissues in absolutely permanent pigments of a brilliancy equal to those made with cochineal lake colours."

As a matter of fact, from the commencement of 1877 all the pigmented papers made by the Autotype Company, with the exception of tissues prepared by agreement to specified formulæ, have been made with pigments of undoubted permanency, and contain not a particle of cochineal colour.

As far as autotype work is concerned the whole of the single transfer prints executed by the Company since July, 1876, have been produced with the permanent alizarine without a trace of cochineal; not only so, but in the mechanical department this rich and powerful colour has entirely superseded the various fugitive lakes ordinarily employed, and, as the specimen now sent will show, giving a brilliancy leaving little to be desired.

Mr. J. R. Johnson, in your ALMANAC for 1878, would fain put back the Autotype Company to the time when he himself produced single transfer prints with salmon-coloured lights—a remarkable specimen of which, given to him by Mr. Johnson himself, now lies before—Yours, &c.,

THE EDITOR OF THE AUTOTYPE MANUAL.

[The accompanying picture is of a rich tone, having all the brilliancy indicated above.—EDS.]

PHOTOGRAPHY IN COURT.—At the Bloomsbury County Court, on Saturday, the 12th instant, the case of Henderson *v.* Lewis was heard before Mr. Judge Russell. The plaintiff sued the defendant, a photographer, to recover the sum of £50 as damages for false representations and fraud in the purchase of defendant's business as a photographer in Marylebone road.—Mr. Marcus M. Lewis, who appeared as the plaintiff's solicitor, said that his client was attracted to the sale of the defendant's business by an advertisement in June last. His client then resided in Shrewsbury, but subsequently came to London to negotiate with the defendant, which negotiation ended in his client giving the sum of £50 for the goodwill of defendant's business, his client having to pay for all rents, rates, taxes, the defendant being merely paid £50 for the goodwill, which in reality was no good at all.—The defendant's solicitor here interposed by stating that if Mr. Lewis intended establishing his case under the statute of frauds the agreement referred to must be in writing.—Mr. Lewis contended to the contrary, as this was merely a purchase of a goodwill and not of any messuage or tenement.—The Judge coincided in Mr. Lewis's view, and the case proceeded.—The plaintiff said that he purchased the business entirely on the defendant's representations. When he called to see the place in June last, several sitters were waiting their turns to be taken, and everything appeared in good working order. There were plenty of good specimens and apparatus, and he was so well pleased with what he saw that he was induced to become a purchaser; but when he commenced operations in July following he found that his receipts barely came up to his expenditure, and, considering he had been grossly imposed upon, he applied to the defendant, who merely laughed at him, and consequently he was advised to bring the present action. In reply to the Judge the plaintiff said he saw no books, as the defendant had not kept any; but he was shown a number of receipts, from which he imagined the defendant was doing a fair business.—The plaintiff's case being ended, the defendant's solicitor urged that this was entirely a case in which the axiom of *caveat emptor* ought to apply. His client merely represented what he was doing, and that the goodwill of the business was fully worth the money paid for it, his client's only motive for selling being his anxiety to settle in the country. His client was a skilled operator, while the defendant was not, and that was the cause that the defendant had not made the business succeed.—The defendant, being called, corroborated this statement, adding that he had made a good living while in the business, and that his only object in relinquishing it was to establish himself in Norwich, where he had family connections, and if the court would adjourn the case he could amply prove this to be the case, The Judge did not consider that necessary, as the plaintiff had failed either legally or in fact to prove any fraudulent intention on the part of the defendant. He should, therefore, give judgment in the defendant's favour, but it was a case in which he would not certify as to costs.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Will give good *carte* lens by good maker in exchange for a strong tricycle, or for photographic accessories.—Address, Mr. Argent, Mill House, Rolvenden.

Wanted, a landscape rectilinear lens, twenty to twenty-two inches focus, in exchange for two Dallmeyer's 1B *carte* lenses.—Address, T. Edge, Llandudno, North Wales.

I will exchange a plate electrifying machine, with Leyden jar, tank, and pipette, for use with sciopticon; graphoscope; or a 24 × 18 carbon enlargement, for magic lantern slides or background, or anything useful in photography.—Address, O. B. M., 30a, Flowergate, Whitby, Yorkshire.

A brass-bound 1-1 camera, by Meagher, swing-back, new; 10 × 8 water-tight mahogany and glass bath, in good order; new tourist's quarter-bellows camera, three double backs and stand, and No. 1 Steinheil lens; an excellent head and body rest, Harrison's pattern, very firm; a firm, folding tripod, good as new; a sporting Snider carbine sighted to 600 yards. Wanted, Dallmeyer's 4D and 12 × 10 W.A.L. lenses, in good order.—Address, S. G. F., Maker, Devonport.

ANSWERS TO CORRESPONDENTS.

Photographs Registered—

H. Cooper, Northampton.—*Group of Lord Clifden and Party.*

John Moffat, Edinburgh.—*Four Portraits of the Rev. Robert Stewart, four Portraits of Rev. Dr. Lees, and two Portraits of the late Mr. Fox Talbot.*

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

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

*** A press of matter necessitates our leaving over a large number of articles and reviews this week, among the latter being *Design and Work* (Purkess); Illustrations for *Gabriel Grub* (F. York); Capt. Abney's *Treatise on Photography* (Longmans, Green & Co.); Dolbear's *Telephone* (Sampson Low & Co.).

Medicus.—No other test than ordinary litmus paper will be required.

W. G. H.—A glance at the back of the *carte* mount explains the cause of the spots—bronze powder.

W. H.—The addition of sulphate of copper to the developer, so far from being a new discovery, has been well known for more than twelve years.

Dalstonian.—We cannot say to what cause the fading of the prints is attributable, but it is certainly not due to their being fixed in daylight.

W. S. (Edinburgh).—If the negatives be thin print the transparencies by the collodion process; but if intense a better result will be obtained by adopting the carbon process.

Geo. T. B.—The practice is reprehensible, but the offender cannot be reached by the law. A statement of the circumstances in your local newspaper, as an advertisement, will prove the most effectual way of proceeding.

L. L. L.—The only point upon which we can suggest any alteration of, or improvement upon, your *modus operandi* is the addition of so much ammonia to the bath as will cause it to change the colour of reddened litmus paper.

S. Berry.—The sliminess upon the surface of the prints may be possibly owing to the admixture of gelatine with the albumen. We know that this kind of adulteration was practised at one time by a continental albumeniser.

S. P. S. E.—The yellow stains on the enlargement are caused by the formation of sulphide of silver. This is probably due to your immersing the print in the hyposulphite fixing bath before thoroughly washing it so as to effect the removal of the acetic acid.

T. J. Whitley.—Rest content at present with the information that the formula will be published at no distant period. It may be during the forthcoming summer; if not then, soon afterwards. This is all that we are permitted to promise at present.

Amateur.—A plano-convex lens (achromatised) would be suitable for including the smaller angle mentioned; but for the larger angle a very deep meniscus is imperative. If the lens be twenty-four inches in focus it will include on your plate an angle of a little over fifty degrees.

Geo. Smith, Junior.—Prepare the two solutions in separate test tubes and pour them simultaneously into the beaker. Chloride of platinum is very easily prepared: obtain some thin platinum foil or wire and place it in *aqua regia* (a mixture of hydrochloric and nitric acid). Solution rapidly takes place.

Old Barium.—Toughness may be imparted to the varnish you are now using by adding a little castor oil. Commence by trying the effect of three drops to the ounce. It may be better to give it an overdose at first, and then bring it back by the addition of plain varnish, which must be reserved for the purpose.

C. B. M.—If we recollect rightly a patent was applied for, but it was not granted. The invention therefore, such as it is, is public property. If upon inquiry at the patent office we find this information incorrect, we shall in next number, or by post card, let you know. We are quite certain that to one applicant, at anyrate, protection was refused.

Lux.—1. See the remarks on this subject in the Almanac. We cannot recommend you any lamp or source of illumination that will be cheaper than the four lamps mentioned by you, unless we advise you to try ordinary daylight.—2. Any powerful light may be employed in nocturnal photography. In addition to those mentioned try magnesium and the burning of sulphur in oxygen.

W. J. W.—The negative sent is much too thin to be successfully employed in the production of a photolithographic transfer. The requisite degree of intensity may be imparted by pouring over the surface a solution of chloride of copper, followed by the ordinary alkaline pyro. developer, with thorough washing intervening; or by treating it first with a solution of bromide of copper, followed by an application of a solution of nitrate of silver. For your purpose the latter will be the better method.

G. J. T.—1. The Howard tent will answer very nicely provided you have acquired deftness in manipulating, which, from your limited experience, we can scarcely imagine to be the case. Practice for a short time at an ordinary sink, until you can conduct the manipulations neatly, and *then* try the tent.—2. We advise you to purchase the emulsion ready prepared. Coat your plates with this, and when you have mastered the small difficulties incident to a first attempt, try to prepare the emulsion for yourself.

B. Proctor.—1. See reply to "W. S.," and make use of a collodion that is of a red colour.—2. Do not imagine that we are inconsistent in advising you to tone your transparencies with bichloride of mercury followed by a weak solution of sulphide of ammonium. This method of toning will impart the quality of tone desired by you; and as, for what we regard a whimsical reason, the transparencies are all to be destroyed within a month of the time of their preparation, the matter of permanence need not be imported into the question. But for this we should not have advised the use of mercury.

Peripa.—You seem to misconceive the power and capabilities of a portrait lens. If it be tried side by side with a landscape lens—a single achromatic combination, for example—both lenses having similar foci and both being "stopped down" so as to have the same working aperture, the portrait lens will not only *not* be quicker in its action, but, on the contrary, will be a little slower, owing to the greater number of surfaces of glass that impede the transmission of the light. When exceedingly rapid exposures are said to have been given with a portrait lens it is usually considered that it has been worked with its full aperture; therefore, in taking "instantaneous" street views, make use of your portrait lens without any stop. This method of proceeding is especially necessary at the present time, when the light is very weak, even when at its best. During bright summer weather stops may be used with advantage, but not at present.

LONDON GAZETTE, *Friday, January* 18, 1878.

Bankrupts.

E. Williams and W. S. Singden, Exeter, photographers.—January 30, Exeter.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For the two Weeks ending January 23, 1878.

These Observations are Taken at 8.30 a.m.

Jan.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
10	30·29	N	35	38	42	34	Dull
11	30·62	NE	31	34	40	30	Foggy
12	30·68	W	33	35	49	29	Foggy
14	30·42	W	44	46	53	41	Dull
15	30·32	W	48	51	55	44	Dull
16	30·27	W	44	47	—	42	Dull
17	30·39	NW	41	44	48	41	Foggy
18	30·50	NW	37	39	44	36	Foggy
19	30·52	SW	39	41	47	36	Foggy
21	30·14	SW	50	52	56	44	Dull
22	30·01	SW	52	54	56	51	Dull
23	29·82	NW	38	42	47	40	Fine

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 926. Vol. XXV.—FEBRUARY 1, 1878.

ON THE CORRECTION OF EMULSIONS AND THE REMOVAL OF FOG.

We will now turn to Capt. Abney's experiments with films fogged by exposure to light. Briefly, that gentleman considers that the destruction of the undeveloped image is due to the oxidation of the loose atom of silver, and that any powerful oxidising agent will be found capable of destroying the impression formed by light. As we stated last week, we can understand the efficacy of oxidising agents in this direction, but we do not think that such destruction or fading away of the impression is solely caused in that manner. In our last volume will be found two articles upon the action of the atmosphere upon exposed films, in which it is shown that ozone is an active destroyer of the image. Our present object, however, in the absence of a distinct course of experiment, is not to criticise Capt. Abney's theory, but to point out one or two collateral facts which have an indirect bearing upon our subject.

After reading Capt. Abney's first account of his experiments with dried films, an impression formed itself in our mind that the action of the various substances might probably be not only the destruction of the impressed image, but also the destruction of sensitiveness. In order to test this we prepared a plate with a wet emulsion, perfectly free from fog. When "set" it was placed upon a levelling-stand, and a few drops of the following agents allowed to act for three minutes upon separate parts of its surface:—1. Saturated solution of potassium bichromate. 2. Ten-grain solution of potassium permanganate. 3. Saturated solution of cupric chloride. 4. Strong nitric acid. After remaining on the film for three minutes the plate was well washed—first under the tap, and afterwards by soaking for ten minutes in water—and then dried without preservative. Upon exposure under a negative the picture was impressed over the whole surface, but varied in strength in the portions treated with the oxidising agents. The chloride of copper had left behind the strongest trace of its action, potassium permanganate coming next in order, the bichromate exhibiting the faintest permanent action. It is probable, however, that by a more lengthened washing the retarding influence might, in all cases, be removed; but in any case the result sufficiently proved to us that the action of such substance does not destroy, though it may impair, sensitiveness.

In connection with the nitric acid we may mention a remarkable peculiarity. Upon developing the plate that portion upon which the nitric acid had been dropped presented a circular central spot, surrounded by concentric rings. The image on the centre portion was quite perfect but extremely thin and delicate, while the surrounding zone possessed very much greater density than the general body of the plate. The appearance was, indeed, such as to suggest that the nitric acid had dissolved the organic silver compound, and that in dropping the acid upon the film the dissolved organic matter was forced away from the centre, accumulating in a circular zone of increased density. Such is, no doubt, the correct explanation of the phenomenon, and it may, we think, be taken as evidence in support of the theory that the organic silver compound does not participate in the formation of the latent image, but only in adding density under development.

Looking at the very slight effect which the potassium bichromate exercises upon the subsequent sensitiveness of the film to which it has been applied, we conceived the idea of rendering that substance practically useful in sensitising an emulsion, or, rather, we put into practice an idea long since conceived but never executed. The original idea was simply to utilise bichromate of potash as an "indicator" of free silver in the same manner as it is employed in Guy Lussac's silver test, of which we spoke a few weeks ago in connection with volumetric analysis. But if, in addition to this, the bichromate act as a fog remover, its use becomes doubly valuable. Accordingly, to a small quantity of plain collodion we added four drops (dropped from a glass rod) of saturated solution of potassium bichromate and eight grains of double bromide of cadmium and ammonium. This was sensitised with fourteen grains of silver nitrate, which allowed for an excess of over two grains after total conversion of the haloid. Upon the addition of the silver in alcoholic solution the emulsion immediately assumed the deep red colour of chromate of silver; but with a little shaking this rapidly disappeared, owing to the decomposition of the silver chromate by the sub-haloid. The mixture then assumed and retained for some hours the appearance of an ordinary emulsion; but when the whole of the soluble haloid was converted it gradually acquired the characteristic colour of the chromate. It was allowed to remain in this state about twenty-four hours, when it was of a reddish-salmon colour—the result of the mixture of the yellow of the bromide and the red of the chromate. It was then neutralised by cautiously adding, drop by drop, alcoholic solution of cadmium bromide, until after standing some minutes the yellow colour became permanent. It was then allowed to rest for three hours, for the bichromate to exert its action.

It is evident that by adopting such a course the nicest possible balance between the combining equivalents of the bromide and silver can be secured, as the faintest trace of chromate of silver will give the characteristic red tinge, which cannot be mistaken. The chromate is immediately decomposed by any of the soluble haloids, when, of course, the colour disappears. A mere fractional part of a grain of free silver will colour a large quantity of emulsion, and a drop or two of alcoholic bromide solution will instantly destroy the colouration. But, unfortunately, the emulsion thus treated refuses to give *the faintest trace of an image*. Plates coated and soaked for a quarter of an hour in warm water, and then thoroughly washed under the tap, gave no image after an exposure five times as long as would be necessary with an ordinary emulsion. The developer was strengthened until uniform reduction of the film took place, but not the slightest appearance of an image was visible at any stage. After the result of the experiment with bichromate upon the dried film the behaviour of the same salt in emulsion appears inexplicable, unless we suppose that it reacts in some way upon the constituents of the collodion; but, even taking into consideration the small quantity present (probably less than one grain) and the very thorough washing given to the plates before exposure, we are at a loss to account for the absolute insensitiveness of the film. We shall, however, pursue our investigations on this subject.

We shall touch upon one more point and then we have finished. Capt. Abney speaks of a difference between his own results and those of others with regard to the action of nitric acid upon the iodide of silver image. In thus making a distinction between the latent image upon iodide and bromide of silver we have been accustomed to consider the difference to arise, not from the different haloids but from the different *mode of development*. Thus, iodide of silver, under ordinary circumstances, not being acted upon by alkaline pyro., is always spoken of in connection with silver development, which differs essentially from the alkaline method almost invariably employed with silver bromide. We do not go the length of stating that there are two distinct actions of light in forming the developable impression; but we believe we are perfectly within bounds in saying that certain substances are capable of destroying that image, *so far as alkaline pyro. is concerned,* while leaving it amenable to the action of silver development. A sample experiment will show the force of this:—Let an alkaline-developed image upon bromide of silver be removed by means of nitric acid in the manner so generally adopted for the production of transparencies direct in the camera. If this reversed image in silver bromide be thoroughly washed, exposed to light, and developed *with pyro. and silver*, the result will be that the transparent portions from which the bromide has been removed (and which represent the original image) will develope as strong an impression as those portions containing the full thickness of bromide; and when a certain stage is reached the image disappears entirely in a uniform deposit of silver.

If this plate, upon which are impressed a negative as well as a positive image, be now washed, and again treated with nitric acid, the reduced silver is removed, and a perfectly clean picture in bromide of silver remains, which may be developed with alkaline pyro. without any abnormal reduction in the transparent portions. It may be urged that the developed image differs from the undeveloped; but it is evident that some latent action must remain after the visible image has been removed to permit its redevelopment. We have mentioned this first in order to suggest that possibly the discrepancies in the results of different workers may arise from some misunderstanding with regard to the mode of development.

In an article in our last number Mr. H. B. Berkeley pertinently asks what becomes of the free "NO_3" set down in the formula we gave a fortnight ago in attempting to explain the *rationale* of the cure of foggy emulsion. We wrote with the full knowledge that NO_3, except in combination, is an impossibility; but we reiterate Mr. Berkeley's question—What *does* it combine with? Assuming the liberation of NO_3 in the manner indicated, there can be little doubt that it combines in some loosely-defined way with the organic portion of the emulsion, which we have endeavoured hitherto to keep out of the reaction; but the more closely the subject is studied the more evident does it become that the organic matter plays its part, but what that part may be we must confess our inability at present to even guess at. As Captain Abney suggests, the formation of nitric oxide would account for the more energetic action of the copper salts in the presence of nitric acid; but are not the circumstances entirely changed when we substitute for the direct action of nitric acid upon metallic copper the mere interchange of elements, one or both of the substances being in the act of disengagement?

If we understand Mr. Berkeley to suggest that to the formation of nitric oxide, by the decomposition of the NO_3 in our formula, may be due the removal of the fog, we can scarcely follow him, though such a reaction may take place, accompanied, however, by the formation of other substances which may possibly have as much to do with the changed state of the emulsion. The subject is so delicate a one, unfortunately, that little light can be thrown upon it by actual analysis; hence theoretical argument and suggestions become of more than ordinary value, and we shall be glad if Mr. Berkeley can clear away some of the obstructions in the way of our present theory or hypothesis.

WATER STORAGE.

The use of a copious supply of water is so necessary and accustomed a matter to the photographer, and he is so apt to overlook or make light of sundry difficulties and dangers attending its use, that we have thought it not inopportune to call attention to the subject, reminded of it, as we have been, by being recently informed of two cases which happened in the same town when sums of money not far from two hundred pounds each had to be paid as compensation for damage from overflows.

The legal aspect need scarcely be dwelt upon here. Indeed, it is difficult to raise a doubt on the question, for instance, of the photographer's liability to be cast in damages if, through a leaky pipe or an overflow of a cistern, a pellucid stream of even the most limpid water should find itself a new bed on a pile of silk velvet, or meander over a richly-decorated wall in a draper's premises below. We would rather try to indicate some precautionary measures that might render impossible any question of law. The subject is important, many other cases than those we write of having from time to time come to our knowledge.

We are afraid that, so long as there are apprentices and careless workmen, so long will there be overflows and floods; but even in such cases it is quite possible to obviate possibilities of damage. We may take a hint from some chemical laboratories where it is not uncommon in rooms, many times larger than the average photographic dark room, to have floors laid with asphalte. It would be by no means difficult nor expensive to have the whole floor of a dark room covered with asphalte well smoothed and worked to a slight fall instead of being perfectly levelled, with a ridge or ledge all round, which would retain any amount of water till it ran in the direction of the fall, where a good-sized exit pipe might be securely fastened. The operator then might leave his room with a light heart at any time, perfectly fearless of damage being done by any overflow, even after the severest frost.

It is customary in most establishments to use a reservoir in which to store water instead of taking it direct from the main, the latter source being liable to fluctuations both in the force of the supply and in its clearness and purity. It is far from pleasant to have the fact brought under our notice for the first time that the mains have been flushed by the sudden projection on to a beautiful negative of a brown mass of the colour of coffee and of the consistency almost of Thames mud—excellent, doubtless, for the variety of subjects it would offer for microscopic enlargements of lower forms of animal and vegetable life, but detestable upon a collodion film. The use of reservoirs as a provision against such contingencies is highly to be commended, the danger, on the other hand, being the great probability that the said reservoirs would become receptacles of dust and dirt. A gentleman using an intermediate cistern in this manner lately found himself in difficulties with his bath, which he had made with ordinary tap water in the same way he had done with success for years. Though he made it in the usual manner he did not get his accustomed results, and he was at last persuaded to test the water, which was found bad—we may say very bad. An investigation proved the presence of one dead rat, two mice, and a large and interesting variety of cockroaches—an injudicious mixture which we considered quite sufficient to account for any little irregularity of action.

The tank need be by no means an expensive one, an old and tight cask answering every purpose, as we know by experience, and the whole could be fitted up with a ball-cock for very little money. We know of a studio where a special alteration of the flooring in the direction we indicate has been made; but for the toning room, instead of the dark room, one-half of the floor under the troughs is laid with Roman cement slightly hollowed to form a channel, and directly on this the washing waters from the troughs and the supernatant fluids from the precipitating vessels which lie beneath are allowed to run off, the channel carrying it to the outside, where suitable arrangements are made for conveying it to the sewer.

Such a floor may be called a precautionary measure. Preventive steps consist in attention to all the arrangements for carrying off the water in the usual manner and the occasional supervision of the supply-cock, which is liable in course of time to get leaky. All reservoirs should have an overflow pipe suitably led away, and of a *greater width than* the supply pipe, so that any contingency may be prepared for.

We believe, however, that in looking into most cases of overflow it will be found that they have arisen from the exit pipes being choked. A case recently came under our notice where some old collodion bottles had been washed, and the tough, dried skin removed from the bottles had collected and formed an impenetrable plug which had prevented the passing of any water, a disastrous flood being only just averted by a timely discovery. Collodion skins and bits of blotting-paper should be scrupulously kept out of sinks under all circumstances; even the largest effluent pipes for dark-room and printing-room accommodation are generally devised for the outflow of simple liquids, and few of them have more than a three-quarter inch pipe to take off all the outflow.

In case of frost all water pipes liable to be exposed to the cold should be protected in the usual manner with haybands if outside, but, if inside, with some more sightly safeguard, such as will be found in common hemp or tow, which answers the purpose well.

Possibly some of our readers may not be aware that it is not the *thaw* that bursts the pipes but the *frost*, the burst only being rendered perceptible when the congealed water liquefies. Professor Apjohn recommended as a protection against frost the soldering at intervals along the water pipe a short length of lead piping closed at one end and open to the water at the other (the soldered) end with the object of relieving the pressure when the water was expanded by frost. Being closed at one end the water could not fill these projections, and the elasticity of the air prevented any uneven pressure. In some cases the plan seems to have answered, while in other hands no success has been obtained. Some of the failures may be attributed to the solder not being put on sufficiently thick, when, through its brittle nature, it has given way at the first sign of freezing, and thus the very means adopted as a safeguard have proved to be the source of disaster. If the precaution with respect to the solder which we indicate be carried out, we think Professor Apjohn's proposal will not fail to achieve the object in view.

RECENT PATENTS.

No. IV.—IMPROVEMENTS IN PHOTOGRAPHIC LENSES.

The name of Voigtlander was much better known in connection with photographic lenses twenty or thirty years ago than it has been during recent years. When publishing, a few months ago, the lists of applicants for new patents, we were pleased to find the name was again to be prominently brought before the public; and, with many others, we waited with no little anxiety to ascertain the nature of the new optical production for which Herr Voigtlander had sought to obtain letters patent. We are at length placed in possession of the desired information by the publication of the following specification, which we give in the language of the patentee, Frederick von Voigtlander, of Brunswick, Germany:—

This invention has for its object improvements in symmetrical lenses for photographic purposes.

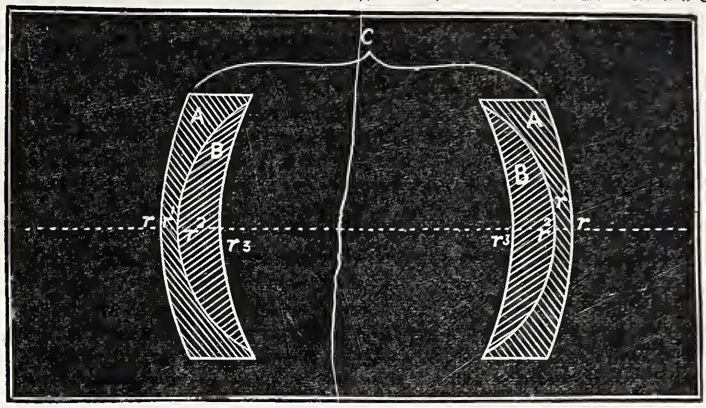
Symmetrical photographic lenses constructed according to my invention possess a considerably greater illuminating power and greater depth of focus than any other of the existing symmetrical constructions. These advantages have been obtained by the peculiarity of their construction, founded on calculations, but especially by the adoption and application of an optical principle not considered hitherto.

In every photographic lens two different kinds of rays come into action, namely, the optical or visual rays, and the chemical (not visual) rays; and from this point of view also two different pictures are obtained, namely, the optical or visual and the chemical picture.

In all photographic lenses hitherto constructed the optical picture was treated upon the same principles as the chemical; but as both kinds of rays have evident differences regarding their action, it has been my study and endeavour to make the chemical picture—which, in fact, is the only one coming into operation when making a photograph—as perfect as possible, even by somewhat injuring the visual picture.

I have fully succeeded in this respect by employing as material a flint glass of very great specific gravity and great refracting power, such as has never been used before for photographic lenses. By this means I am enabled to over-correct the visual picture—that is, give an overplus to the blue spectral rays; thus the chemical picture (the useful one in photography) is brought to that perfection which my new lenses possess. Also by this same means I am enabled to shorten the combined focus of this construction, so as even to obtain a proportion of six to one between the focus and aperture, and from this important circumstance, according to the laws of optics, the lenses derive great illuminating power.

The drawing represents a vertical section of a symmetrical photographic lens constructed according to my invention. It consists of



two exactly symmetrical object glasses. Both object glasses are exactly identical, and consist each of two lenses (menisci); the object glasses are so placed that the concave sides face each other. The lens A consists of heavy flint glass, the index of refraction being = 1·655; of the other, B, the refracting index is = 1·55.

The combined focal length of such a system being supposed to be .... = 1·000.
The aperture of the object glasses is .... = 0·666.
The ratio of curvature for the radius r ...... = 0·208.
" " r^1 ...... = 0·100.
" " r^2 ...... = 0 100.
" " r^3 ...... = 0·292.
The distance between both systems C ...... = 0·2.

The surfaces r^1 and r^2 are exactly identical, and cemented together with a permanently transparent cement. A central stop, allowing the instrument to be used with full aperture, is placed between both systems, and a number of smaller diaphragms are furnished to provide for all required purposes.

Having thus described the nature of my improvements in symmetrical lenses for photographic use, and the manner of their construction, I would have it understood that I claim—

First. The manufacture of such lenses in which the differences of the visual and chemical picture are profited of to render the chemical (useful) picture as perfect as may be, and also to obtain a considerably-increased illuminating power with great depth of focus, substantially as above described.

Second. The construction of symmetrical lenses for photographic uses with the parts formed of the densities and curvatures, substantially as above described.

The above, when reduced to ordinary photographic language, must be held to mean that the lens is one of the same form as that which in our Almanac for 1870 was described, and illustrated by a diagram, as the well-known "rapid rectilinear." From this it differs in being made of dense flint glass instead of ordinary flint and crown.

By making use of a dense flint it is undoubtedly possible to increase the aperture—a fact that was specially pointed out by Mr. J. H. Dallmeyer, at a meeting of the London Photographic Society during the same month in which the Almanac above alluded to was published; but this advantage, in the estimation of that gentleman, was purchased at too great a price, namely, the deterioration of the glass of which the lens was constructed. Presuming that Herr Voigtlander has had his attention directed to the interesting researches made by Mr. Gaffield, of Boston, with respect to the changes that certain descriptions of glass undergo after an exposure, more or less brief, to light, and in virtue of which a dense flint glass after a short time acquires a decided yellow colour, we further presume that the glass he employs in the construction of his lenses differs from any hitherto employed for this purpose in not being affected by light—a point which, not being mentioned in the specification, we can, however, only guess at.

A special feature claimed by the patentee, and one possessing interest from a scientific point of view, is that in which he boldly takes the "bull by the horns" and directs attention to the non-coincidence of the chemical and visual foci, to which he attaches much importance; for he says in the provisional specification—"I construct the lens so as to be over-corrected and somewhat imperfect for the visual picture, in order to obtain the chemical picture as perfect as possible. This I am enabled to do by making one of the glasses of each lens of a symmetrical double combination lens from a glass of greater density than has ever before been used in the manufacture of photographic lenses." On this point of the invention we may here observe that many photographers in this country have ever displayed a decided antipathy towards lenses possessing such a distinction between the two foci; while others, conceiving that by leaving the visual focus "to take care of itself" a greater number of the chemically-active rays might be brought to a focus together, have given their preference to lenses in which the chemical and visual focus did not coincide.

STUDIO FOG.

Two or three weeks ago a gentleman from Northampton, writing upon this subject, asked if I or anyone else could aid him in expelling this photographic demon. When he is once in possession, "Pylos" is perfectly correct in speaking of the difficulty in expelling him. There is not a photographic grievance at any time of the year more difficult to bear or more troublesome to circumvent. What is more disheartening than to enter one's studio upon a winter morning, the sun, perhaps, just breaking through the clouds, and giving promise of a bright, sparkling day that will bring sitters out, and then to find all over one's own quarters a dirty atmosphere fatal to any brilliancy of effect? The evil can often be palliated, and sometimes quite cured, but often as not some lowering in the transparency of the shadows has to be put up with.

It will, perhaps, be some help towards taking steps to mitigate the trouble if we consider its cause. I am not going to enter into a disquisition upon fogs in general, but only upon one phase of them. The difficulty with studio fog is that it often remains long after the external atmosphere has cleared to its normal transparency. With any apartment having windows or doors opening out upon the open air, whenever a fog arises during the night or the early morning it is sure to penetrate and fill such apartments with its thick mist, and fogs in towns always bear an immense amount of sooty flakes mixed with the minute corpuscles of water which constitute a true fog; for all the smoke discharged into the atmosphere remains suspended, and I am inclined to think the presence of the watery particles assists the sub-division of smoke particles which, instead of clotting, as it were, become smaller and smaller, and so are more difficult of precipitation. It thus follows that when the sun rises, if few or no clouds are present to obscure it, the suspended water is soon converted into invisible vapour and the fog begins to disappear, the yellowness of the atmosphere being caused as much by the fine grains of carbon composing the smoke—acting in the manner so beautifully explained by Professor Tyndall—as by the finely-divided water. In the open air, however, these smuts gradually subside, or are blown about till they coalesce, just as a finely-divided precipitate coagulates upon shaking, and drop upon the streets and housetops. But all this while in the studio the air is still, and the sun does not shine in. There is no mass of air in the higher strata which gentle breezes can cause to mix with the fog-bearing lower ones and dissolve the water drops as occurs outside.

The treatment thus indicated is to get plenty of heat in the studio, plenty of ventilation, and as many "draughts" as possible to assist in shaking and stirring about the invisible soot particles, causing them to agglomerate and fall.

If "Pylos" will be up in his studio in good time, and see that his helps "fire up" well, and, if the fog has cleared outside, open all his ventilators, doors, &c., he will soon find a change. Many studios are heated by open fireplaces and others by stoves, and the boy who usually attends to these matters is not wont to be particular in the matter of smoke, so that too frequently the studio fog owes some of its thickness to his carelessness in lighting his fires.

I used to experience considerable difficulty in my last studio from this cause; but it was to a great extent got over by making a sheet iron blower for the fire, *i.e.*, a movable screen which, when hung up before the fire, created such a draught that no smoke could come down; and, unlike many contrivances, there was no fear of the boy not making use of it, for his labour was so much facilitated by it that he more frequently went to the opposite extreme and left it on till the fuel was burnt away. Under any circumstances it was a great help, and I would advise anyone whose studio is lighted by open fireplaces to have such a screen made.

As I have on a previous occasion stated, my present studio is heated by hot water—that system under which the water is at high pressure. I like it as much as ever. Half an hour after lighting the furnace the room is perceptibly warmer, and in a little longer time is as hot as is required; it soon tells upon the fog under ordinary circumstances.

There is one other condition which may be alluded to; that is, in winter time there are so many fires going that a far greater amount of smoke is thrown into the atmosphere. I have known cases where one particular chimney-stack had been the cause of intolerable trouble, and which might have been guarded against by taking especial precautions when the wind was in a quarter which blew the smoke into the studio from that direction.

I have indicated the most practical means of curing the fog, and when all is done one can only try to evade the residuum. Thus, as I have before recommended, use short-focus lenses, and *discourage full length portraits as much as possible.*

As to the chemicals little can be said. No arrangement or selection of them will enable a clean picture to be taken through a foggy atmosphere; but particular care may be taken that the fog is not added to by the chemical manipulations. At the time of the year when fogs are prevalent, speed is of every importance, and hence old and slow collodions can scarcely be used, though their freedom from chemical fog is well known. Still, let every thing be in good order, bath and developer made warmer, the dark room at a genial temperature, and then all will have been done that is possible.

G. Watmough Webster, F.C.S.

THE ART OF PAINTING ON THE PHOTOGRAPHIC IMAGE.

No. XVIII.

One of the chief drawbacks to painting in Swiss crayon or pastel is the immense variety of separate crayons of various tints required to produce really good results; for, although the crayons are, in a sense, mixed and blended upon the paper, if too many separate ones are used on the same place (which must inevitably be the case unless you have a crayon of at least an approximate tint) a kind of greasiness arises, and the place gets polished and bright and refuses to take any more crayon.

As you are very liable to rub the lower part of your picture whilst working above, it is as well to begin at the top, working downwards, getting as much force as you can at once, and this you may the more easily do inasmuch as the colours do not change at all or run, but remain in their places. Take suitable crayons and rub in the upper part of the background; or the whole of it may be put in, as you are not so likely to disturb it afterwards, but you must first consider carefully what the face will appear when finished, and where it will require relieving by the background. Should the background be very much too light, or quite white, I should strongly recommend a deep wash or two of water colour, *without gum*, as a preparation. On vellum or proper paper this would not be necessary, but most photographic papers are not all that could be desired for crayon painting; indeed, I have sometimes found a broad washing in of the whole picture in water colours a great assistance, or the strong shadows may be temporarily warmed up with them before commencing on the high lights—for the same reason that I suggested glazing them first in commencing an oil portrait, for the crayons are very powerful, and the putting on of the high lights makes the rest look terribly grey and weak.

After having got your background to your mind, take a crayon of a suitable neutral tint and broadly map out the high lights on the hair, then the local colour, and then the deep shadows. Leave them crisp and sharp for the present; then with a light buff crayon put on the high lights on the face. Next lay a pure flesh, then the light grey, and so on precisely as in water colours. Let the strokes be broad and close together, here and there cross-hatched with slightly different tints; and when you have got the face to look tolerably complete *at a distance* you may begin to blend the different tints, commencing with the lights and working into the shadows. By this process you may get any amount of softness of outline and the utmost delicacy of tint. Should you want a few sharp touches about the nostrils or eyes, they may be got by little bits chipped off the crayons so as to get a sharp corner; or the hard crayons may be used, if preferred. The latter are, perhaps, the most manageable.

After you have softened the hair you may proceed to put in all little sharp lights and shades or matters of detail, using a stick to rest your hand on to prevent rubbing. A dark line here and there may be put on the light, or a light one on the dark, to prevent too stony or solid an appearance. After you have got the face modelled up and softened, a few broad touches here and there, scarcely perceptible, but following the lines of the face, have a valuable effect. Drapery can very easily be done with soft crayons, and most beautiful effects got with the utmost rapidity; indeed, when once the artist has mastered this mode of working, there is nothing equal to it for rapidly producing bright, clean, pleasing, cheap pictures, for club purposes, &c. The crayons completely hide the photograph, as in oil; indeed, a skilful, sharply-treated crayon head should look like oil at a little distance.

And now I must conclude these papers. Artists of old standing may (if they have taken the trouble to glance at them) have smiled at some of my recipes, and think them savouring of empiricism; but they should remember that this series of articles has been written principally for the beginner and those unused to art technics. I do not think I have said much to lead learners astray, and my aim has been to save time to the tyro in finding things out. To such I would say—Do not be discouraged by first attempts, and be assured, at all events, that the foregoing papers describe methods by which the very best results have been obtained, and such as have given satisfaction to the public. JOSEPH WAKE.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

The interesting account of the production of the once famous Breese "moonlight" and other pictures which is now being published is, to many, a truly delicious morsel. It was in 1861 that Mr. Breese first entered upon the stage as a photographer, and he jumped into notoriety all at once by the boldness of his conceptions; for he produced views and other scenes, mostly marine, in which he imitated moonlight effects with so much skill as even to have led to more than one editorial expression of opinion in a contemporary as to their being real moonlight views—that is, views taken by means of moonlight, as they purported to be. The "cat has now been let out of the bag," and we have what may be designated an *ex cathedra* statement as to the manner in which these "moonlight" views were taken, viz., by *sun*light, as every physicist knew all along. Great credit is due to Mr. Breese for the boldness of his conceptions and the natural and beautiful manner in which he carried them into effect. When the whole of Mr. Oakes's communication has been submitted to the public it will, I venture to believe, give a "fillip" to stereoscopic photography as welcome as it is much required. Mr. Harmer's letter on the same subject is characterised by much ability and facility of description; and it is to be hoped that he will very speedily redeem his promise of giving a few more details on the photographing of clouds, moons, &c. He may rely upon such details being received with an unusual degree of interest.

With pleasure I note the advent of a new developer for dry plates. Having experienced a failure upon my first trial of the ferrous oxalate developer, I think it well to explain, for the benefit of those who may be about to try it, the cause of that failure. The ferrous oxalate is soluble in neutral potassic oxalate; but it must be borne in mind that there are several oxalates of potash, and unless the proper one—the *neutral* oxalate—is obtained, failure is certain to be the result of the trial. So far as my experience goes this salt is not kept in stock by any of the dispensing chemists, and I have even inquired for it fruitlessly at the establishments of two or three so-called "photographic chemists." Still, it is easily procurable at several well-known chemical establishments in London, and doubtless equally so in every large town. What is required is a better and more economical method of preparing the ferrous oxalate than by the decomposition of oxalic acid and protosulphate of iron, which results in an unconscionably small quantity of the desired salt, and in the formation of "no end" of sulphuric acid as the by-product. From the little I have seen of this developer I consider it is well worthy of a thorough trial.

Apropos of explosions while preparing oxygen: there is one cause of these which, although not frequent in its action, yet does exist, and to which attention might be directed. The thread of the screw in the mouth of an iron retort not unfrequently becomes rusty, necessitating the application of a little oil or grease to cause the screw to work easily. If any of this oil be left about the tube or the retort when these are connected, woe betide the experimentalist, as the heat necessary for the production of the oxygen will also liberate olifiant gas from the oil, and the mixture of these two gases forms an explosive compound possessing great force.

I observe that one of the metropolitan magistrates has had the subject of fulminating silver brought under his notice, and in the course of a judicial trial involving its manufacture a statement was made that, with the exception of fulminating gold, this is the most powerful and dangerous explosive known. Is not this a great mistake? I have always understood that fulminating mercury was more powerful than gold, that fulminating silver was stronger than mercury, but that none of these fulminates could at all equal in explosive force the chloride of nitrogen. I have been present in a lecture room when a globule of this substance, about the size of a grain of mustard seed, was touched by a bit of phosphorus not much larger than itself. The explosion that ensued was "a caution!" It was a favourite belief of the late Rev. J. B. Reade, F.R.S., that the chloride and iodide of nitrogen, especially the latter, were yet destined to play an important part in photography; but as both these preparations are members of the same lively family, who possesses sufficient courage to go in and grapple with them? To "beard the lion in his den" is a joke when compared with experimenting with either of these pretty playthings; and yet the iodide (I can speak of this from personal acquaintance) may be rendered comparatively safe by keeping iodine in excess when preparing it. Among the useful properties of this substance is that of dissolving gold and forming a metallic crystalline vegetation of a beauty of form undreamt of by the generality of microscopists. All that I have to say is—keep the iodine in excess. I wonder if a bromide of nitrogen would not be formed by the union of bromine with ammonia, and if this would not possess similar evil, and possibly similarly useful, powers as its other relatives of the halogen family! The temptation to try is very great; but, unfortunately, the anticipated danger of such trial is very much greater.

(To be continued.)

EXPOSURE.

Photographically speaking, what is exposure? The text-books tell us that it is an indefinite "something" which can only be judged of at the time of taking a picture. In the case of the tyro this only leads to a state of bewilderment as to what exposure is, and I therefore propose to give some definite ideas upon the subject, which, I trust, may be found of service to everybody engaged in photographic pursuits.

We all know that the solar spectrum is made up of many colours, and that from violet to red, or from white to black (speaking photographically), there are many gradations or half-tones. To render these in all their force and beauty, whether from the original subject or from the negative, by any printing process should be the end and aim of the artist—not to give, as is often done, a shadowy resemblance, or a hard, cardboard outline, but the soft and delicate blending of one shade or line into the other, making the whole harmonious and beautiful. I well remember, many years ago, in a correspondence with Mr. George W. Wilson, of Aberdeen, his remarking:—"I like my pictures to be so composed, arranged, and printed that, although the centre may be the most beautiful, it shall be looked at by the observer as one harmonious whole;" and I think all must acknowledge that this is faithfully carried out in all his compositions. But to return.

A careful study of the spectrum in its relation to natural objects reveals to us this fact—that in nature there is literally very little of what we should term pure white; that white is made up of a series of tones, one of which, overlapping or blending into the other, goes to form what we call white. Indeed, if we had much white around us our lives would become unendurable; for we should be in a perpetual glare, and our brains be in such a state of activity that our existence would be considerably shortened. This we find with plants grown under blue or violet glass. They grow immensely and quickly, but they are weak and spindly; while others, grown under ordinary conditions, are healthier and better in every respect. And so it has pleased Providence to give us much green and brown and grey and red, all sombre colours, which dilate the eye and keep it in a state of rest. Further: most objects around us are flatted or dead, if I may so term it—absorbent leaves—giving us only here and there hard horny leaves which reflect light from their surfaces, the one benefiting the other in its growth.

These are points which do not often strike the casual observer, but they have a grand bearing on our art-science—far more than we have any idea of; for, when we have arranged our composition—be it portrait, or landscape, or machinery, or maps, or drawings—with many it is only a matter of guess as to what the exposure shall be, while to the careful thinker—the lover of his work, who sees more than just the ordinary end, and into whose calculations pecuniary gain does not enter—it is a matter of certainty, or nearly so, as to whether he shall have a successful issue. And so it ought to be in every case. The remarks of Mr. Wm. Bedford at the December meeting of the Photographic Society of Great Britain were very pertinent to this end, and show that he is a most careful, observant worker. See also a paper by Mr. Payne Jennings in this year's British Journal Photographic Almanac. And why is this? Because so few care to make a study of what colours their subjects are composed.

Every locality and every studio has a light peculiarly its own, due to its surroundings and formation—nay, more, due often to its soil and subsoil. The exposure you would give at the seaside would be shorter than that given inland, because the water, acting like a huge mirror, throws such a mass of light into the sky as to, in some cases, obliterate the finer details of objects that are in close proximity to it; while in localities where there are many trees and much vegetation—such as moors and heaths, and many of the rivers met with in Devon—the green light thrown into the sky lengthens the exposure to what many would call an absurd and preposterous length, and yet when pictures have been seen taken under both these conditions they have been pronounced to be clean and perfect in each case as to detail and gradation of tone and shadow.

A study of the spectrum also conveys to us a knowledge of the seasons, and when we may expect to obtain better effects at one time than another. For instance: in winter, when the Sun is closer to us, we get less light, because his rays are more parallel, and, mixing with the vapour of the earth, are more yellow or less actinic; and nature bears this out, because everywhere it is at rest. In trees, plants, and shrubs (except those of the horny nature before spoken of), the sap gone down, are in a state of repose, resting after the exertions of the past, and maturing and invigorating themselves for fresh efforts in the time to come. In spring and early summer the most rapid work may be done; but when we get into the full-tide of heat the light becomes almost *nil*. Autumn much resembles spring, and many of the finest effects are to be then obtained.

People say that photography is rapid. True; yet everything takes time, and unless all the conditions are equal, success must not be expected. It is the careful, thoughtful worker that wins the prize. If the film be very sensitive and the light very slow—say from black, brown, or green objects—unless the exposure be made in a particular way the detail in the shadows will be lost, being obliterated by the too rapid action of light on the plate. Thus the negative will be wanting in harmony, which no amount of retouching and dodging will make equal to one properly exposed.

Many forget that light, however actinic, works but slowly, and that something more than light is necessary to produce colour in the petals of a flower or the leaves of a tree—indeed, playing quite as important a part; and, unless the two be in combination, the one is powerless without the other. Temperature, therefore, must be studied as well as light in exposure—each in its volume—or success need not be looked for.

It has been urged by some that it is impossible to link the light of the interior of a church or of a large room with the spectrum. But this appears to me simple; for, by a study of the light within from the window glass and surrounding objects—whether yellow, orange, green, or violet—the exposure may be regulated, the collodion being suited to the purpose in question, and likewise the developer.

In the early edition of Hardwich's *Manual* is a woodcut of a spectrum, and it is urged that a photograph be taken of this from a coloured representation, and the effect noted of each colour upon the film. This would be of great service to all workers; and, if remembered in practice, would save much trouble and annoyance.

In conclusion: if your readers will turn to page 156 of The British Journal Photographic Almanac for 1876 they will there find an epitome of what I have here written on in detail.

W. Harding Warner.

HOW TO EMPLOY PHOTOGRAPHY AND THE LANTERN AS EDUCATIONAL AIDS.

No. III.

In my last article I stated my faith in any system which would make learning a labour of love to the young as it is to the old when trained to studious habits, and that the teacher should aim at becoming the trusted friend of every pupil instead of his or her arch enemy. In endeavouring to show how photography and the lantern may become, as I believe they will become, important aids to education, whether employed at the infant school or university, I shall be forced to discuss points in the past, present, and future systems of teaching.

I think most educationists (I believe that is the right word, though I like the term "educationalist" better, as not sounding so "hard," though it be a trifle longer to write) of the present day are of one mind as to the necessity of imparting all learning in a series of "grades" founded on logical systems, and of banishing everything in the shape of "parrot work," or learning by the method of rote instead of by reason—a system of the old school admirably contrived with the view of making the pupil believe that he or she had learned a lesson, and the pedagogue to labour under the delusion that he or she had done his duty, like a man or woman, and had "heard" the lesson of such pupils, and that he or she had imparted a modicum of extra knowledge thereby.

"God save the mark!" Was there ever a more benighted system of teaching than that of learning columns of spelling, pages of history, geography, and all the rest of it—when it "went in at one eye and out at the other?" What more horrible than to hear the drone of a pupil going through his daily purgatory, when one felt there was not one atom of intelligence, whilst they were all carrying on "the same old game!" Undoubtedly it is a matter of dire necessity that every moment of a school child's life should be devoted to acquiring a clear comprehension of all that is put before it, and to see that it masters all that is professed to be taught.

Beginning at the infant school, who does not recollect the class of books which attempted to teach the alphabet by such insanely-ingenious methods as "A was an Archer and shot at a frog; B was a Butcher, and had a great dog." Or "A stands for Ape, B stands for Bull, C stands for Cat," and so on!" But do they? If we could give vitality to A, B, C, and all their twenty-three companions, they might cry out with "Abraham Brown, the Sailor"—"I'm myself, and no one else!" They stand out clear for easy recognition by the infant through "sight knowledge," if simply placed in bold form before their eyes, without any admixture of such extraneous nonsense.

But care must be taken that the teacher, or the system he is bound to work by, does not go in for "the Gradgrind school" of *hard* facts. Facts are matters necessary for the youngest mind, but we must not impound them in a crust that is too hard for digestion.

I would advocate some such system as this:—On a young child being introduced to its teacher, it should be *made* to feel that its "pastor and master" was also its kind friend, protector, adviser, and an emblem of justice recognisable even by an infant mind—one to be trusted, not dreaded. Next, that *punctuality* to school hours was a matter worthy of notice by its friend, and also of reward in the shape of "marks." Next, that *order* is a thing to be learned, and that "a place for everything and everything in its place" gives comfort and saves time to such an extent that it is also worthy of reward.

Next, that there is One "God"—the Creator—the *Father of all*—whether they be Jew, Pharisee (observers of rites and ceremonies in the widest sense, as applicable to present days), Mahometan, Roman Catholic, Protestant, Dissenter, Gentile (according to modern meaning as applied to Deists, Pantheists, Atheists, Fire Worshippers, Savage Idolaters, and Demon Worshippers)—and that from God springs the laws of *morality* (a simpler and better term than "religion" in these multisectarian days, when the term too often means a splitting of straws over the veriest trifles), which are—I. *Reverence** for God, for Mother and Father, and for the Law of the Land. II. *Government of Temper*," so that "thou shalt do no one an injury" by act of tongue or act of violence." III. *The Law of "Meum et Tuam."* IV. *The Law of Contentment* (or non-covetousness and the wickedness of avarice). V. *The Law of Humanity*, or kindness and charity to one's fellow-creatures and to all animals. VI. *Truthfulness and Honour.* VII. *Justice*, or the necessity for punishing all who transgress the laws of God or man after fair inquiry on truthful evidence. That all the laws of morality are summed up in the Christian precept—"Do unto others as thou would have others do unto thee." Some teachers have a wonderful knack of placing the primary laws of morality in a shape comprehensible to the infant mind with the

* I think "reverence" is going out of fashion. A son nowadays speaks of his "Father" as "The Guv'nor," "The Old Boy;" and of his "Mother" (loving term as it be) as "Mater," "The Missus," "The Old Woman," and, worst of all, "The Old Gal;" whilst both are regarded as of the Rip Van Winkle type—*at least* twenty years behind the age—as to all worldly fashions, modes of thought, and expressions.

view of imparting the first glimmer of *the necessity for discipline* both in school and worldly life.

A child will also acquire, through the behaviour of its companions, in any well-managed school notions as to the *advantage* of conforming to the rules laid down for school discipline, as a school is the world in miniature, and this sort of training cannot be acquired too soon.

The next step is to acquire a knowledge of the alphabet, and I do not know of a better way than to give each child an arranged tray of large letters, and, on an assistant teacher calling out a letter, those who pick out the same correctly and hold it up the quickest being credited with a mark. All marks should be reckoned up at the end of every week, and the sum-total valued and paid for in "sweets;" for there is nothing like appealing to a child's stomach in all matters of rewards. As we grow older human vanity comes into play, and then medals, decorations, titles, and baubles of all sorts become an inducement to "go in" for work, so that we may acquire distinction amongst our fellows. In fact, I do not think we fully appreciate or, at any rate, acknowledge the part the stomach plays in worldly affairs. A well-to-do man is a giver and receiver of "feeds," and his "dear friends" will put their hands deep into their pockets to return his stomachic friendship; but should he come to grief then they would not spend five shillings to save him or his children from starvation (unless, indeed, they could have their names, with address, advertised in a "subscription list" in *The Times* to enlighten the world as to their "charity"), whilst previously they would have spent five or even fifty pounds to gorge him, when already full to repletion. Ought we not, then, to appreciate the value of appealing to the stomach as well as to the heart, even at the first beginnings of life? SAMUEL HIGHLEY, C.E., F.G.S., &c.

ON THE REDUCTION OF ALKALINE IODATES AND THEIR EMPLOYMENT IN THE PRODUCTION OF IODIDE OF POTASSIUM, IODIDE OF SODIUM, AND IODIDE OF AMMONIUM.

[A communication to the Photographic Society of Cologne.]

IN *Dingler's Polytechnischen Journal* (vol. 223, page 443) I came upon the following note:—" On the preparation of potassic iodide: Pellagri found that a dilute solution of iodate of potassium when shaken up with iron filings is completely converted, especially when warm, into iodide of potassium, without either solution of the iron or precipitation of the iodine. Chiappe and Mallesci now show that this process is also applicable to the preparation of iodide of potassium on a large scale. Iodide of sodium may also be manufactured on this plan."

This note having attracted my attention I began to experiment, and having perfectly confirmed the correctness of the statement that iodate of potassium is reduced to iodide of potassium, a portion of the iron being converted into an oxide, I extended the experiment to iodate of ammonium, and was perfectly successful in reducing that iodate also. This apparently trifling property possessed by iron of reducing alkaline iodates is of great practical value. Until now it was impossible to get pure iodide of potassium, sodium, or ammonium, from iodine in a solution of potassium, sodium, or ammonium, on account of the difficulty of removing the iodate salts which were continually being formed;* consequently a roundabout way had to be taken of attaining the end in view—a proceeding necessarily accompanied by a rise in the price of the preparation. Now, however, to manufacture iodide of sodium or potassium one has simply to use the sodic or potassic ley directly after its production from the carbonate and lime. After having ascertained the strength of the ley, the manufacturer adds the quantity of iodine proportioned to the strength and quantity of the ley, and stirs it about until the colour has completely disappeared; he then adds the iron filings and moves the whole. As soon as the complete absence of iodate has been proved by testing a small quantity, the whole is filtered off and evaporated to crystallisation.

To prepare iodide of ammonium one proceeds in the same way; but an excess of ammonia does no harm, being volatilised during the evaporation. Lastly: this preparation should be evaporated on the water bath, on account of the volatility of iodide of ammonium at a higher temperature. In order to get a colourless preparation a bright bar of cadmium is placed in the solution while the evaporation is going on, the slight formation of iodide of cadmium which may thus be induced doing no harm when the preparation is used for photographic purposes, and iodide of ammonium is scarcely used for any other purpose.

* The iodate of sodium or potassium is converted into iodides of sodium or potassium by heating to redness with charcoal.—Ed. of *Photo. Monatsblätter.*

The prepared iodide of ammonium (about five hundred grammes) which I exhibited to the Society was prepared by this method, and is perfectly free from iodate. It was allowed to stand for two days with the iron filings in it, and it was several times shaken up during that time. It is not, however, necessary for it to remain so long with the iron, as small samples tested were ready in a few minutes. The employment of heat is necessary with this process. C. BAUMANN. —*Photographisches Monatsblätt.*

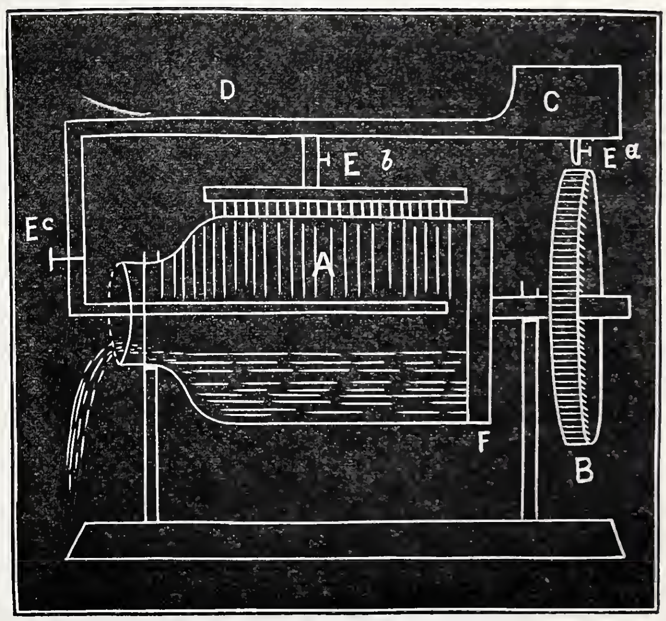
NOTES FROM THE NORTH.

IT must be gratifying to those who believe that in emulsions lie the future of photography to notice the almost universal interest which is being manifested in that method of manipulation. Here in the north we stood out against the innovation for a considerable time; but fact proved stronger than prejudice, and for landscape works, at least, the bath is rapidly becoming a thing of the past.

How best and most conveniently to remove the soluble and useless salts from the emulsion is still a question among experimentalists, and Mr. John Ogilvy, of Brechin, has just sent me a valuable contribution towards its solution in the shape of a drawing of a simple self-acting apparatus that he has devised for that purpose.

It consists of an ordinary Winchester quart, to the bottom of which has been cemented a disc of wood carrying a spindle, on the end of which is fixed a simply-constructed water-wheel. This is supported, free to revolve, at one end on the spindle, and on the neck of the bottle at the other, by two uprights firmly morticed into a base of inch-and-half wood measuring about 18 × 10 inches. Fixed in any suitable way—depending, of course, on the position in which the apparatus is to be used—is a tube bent twice at right angles, having one end connected with the house cistern or other water supply, while the other passes through the neck of the Winchester, reaching nearly to the bottom, and being pierced by a number of fine holes. On the portion of the tube exterior to the bottle, and immediately over the wheel, there is a tap, the water from which keeps the apparatus in motion, and a second tap and ┬ piece, also perforated, is intended, when necessary, to cool the bottle, while a third tap just before the tube enters serves to control the supply of water to the interior.

The annexed diagram will more fully explain the apparatus, and the method of using it will be obvious to emulsion workers. It is as follows:—



A Winchester quart.
B Water-wheel.
C Cistern.
D Water pipe.
E a, E b, E c Water taps.
F Disc cemented to bottle.

In the case of gelatine the bottle should be slightly warmed to prevent too rapid setting, the emulsion poured in and the apparatus placed *in situ.* The tap E *a* is then opened, which will cause the bottle to revolve, and the emulsion will be evenly spread over the interior in a thin film. As soon as this is accomplished the tap E *b* should be opened, when the water escaping from the perforations in the ┬ piece will, by lowering the temperature of the bottle, cause the emulsion to set. When this is done E *b* should be closed and E *c* opened, and if the head of water be sufficiently high it will be projected in fine streams and in considerable force against the film on the upper side of the bottle. When the water reaches the level of the neck of the Winchester it will run out as fast as it goes in, and the whole may be left to take care of itself until every trace of soluble matter is removed. This, Mr. Ogilvy finds, is accomplished in about four hours; but, as the machine is self-acting, it may safely be allowed to go on all night.

No doubt an ingenious photographer will find other purposes to which the apparatus may be applied; but I have reason to believe that for that for which it has been designed it is admirably suited, and need cost only a few shillings for its construction.

I have inserted the diagram as it was sent to me, but would suggest as an improvement that the uprights should be extended so as to support the water pipe, the bearings on which the neck of the bottle and axle of the water wheel revolve being attached as brackets.

The difficulties connected with the successful photographing of paintings, especially when the canvas is large, are well-known to all who have tried that kind of work; and, as during a recent visit to the establishment of Messrs. Doig, McKechnie, and Davies, Edinburgh, I saw how Mr. W. H. Davies had overcome them, I think a brief description of the method adopted may be both interesting and useful to the readers of The British Journal of Photography.

The conditions were somewhat as follows:—The canvas measured 9 × 5 feet, and the copy was required to be exactly 36 × 20 inches. The light at this season is none of the best, and experience showed that with wet collodion an exposure of about three hours would be necessary, and the floor (at least that portion of it on which the camera stand is placed) of the otherwise excellent studio, recently erected, vibrates under the tread of those moving about to such an extent as to interfere with the sharpness of the image.

The first requisite was a suitable camera. As a bellows camera is apt to bulge in when on a long stretch, and is otherwise objectionable for very large sizes, Mr. Davies adopted the telescopic form. With a view to easy sliding and inexpensive work, he ignored the idea of making the slides light-tight, and made each some five-eighths of an inch smaller all round than that into which it goes, trusting to black cloth thrown over the whole to keep out light. With a view to reduce the friction to a minimum, each sliding part rests, not on the bottom of that into which it slides, but on two narrow strips of wood; and in this way a very slight pressure is sufficient to lengthen or shorten the camera. The dark slide, which is made for plates thirty-seven inches square, is reversible, the flap and back fitting either side, and so arranged that for ordinary work the image may be received directly on the film, or after passing through the glass, when a reversed negative for carbon printing by single transfer is required; and, for convenience and economising space, the flap comes out at the side, is in several pieces, and hinged so as to fold in opposite directions.

The vibration was overcome by ignoring it altogether and suspending the camera from the roof. Four strong frames, each about four and a-half feet square, are hinged to the roof, so as to be folded up when not in use, and when hanging down are braced together by angle-tie rods, so as to be perfectly rigid. On any two of those frames two strong battens or wooden rails are laid, and on these the camera rests, and can easily be moved backward and forward till the image has been adjusted to the proper size. I do not know whether this arrangement is new, but I can recommend it as very cheap and thoroughly efficient.

With this apparatus, so arranged, the painting was placed in position and the operation of focussing tried; but, from the angle at which the light fell on it, some troublesome reflections were produced. This was easily cured by slightly inclining the picture forward, with the result, of course, of throwing the image off the square. A swing back, therefore, was a necessity, and this Mr. Davies rapidly improvised. Acting on his faith in the efficacy of a black cloth, he withdrew the dark slide (which is also used for focussing) out at the top till it lay in the same plane as the picture, and held it in that position by a slip of wood into which he had cut a slot a few inches in length. One end of this was fastened to the camera by a picture ring, and the other in the same way to the slide, a cloth over all perfectly excluding the light.

Focussing and adjusting was a somewhat troublesome operation—an exact size, a true square, and perfect sharpness being required. The first was got by calculation, the focus of the lens being known; the second by careful measurement of the image—not, however, from top to bottom and from side to side, as is too frequently trusted to, and which, except in the case of a direct square, cannot be relied on, but diagonally, from upper right to lower left corner, and *vice versâ*. When the two measures are absolutely alike the square must be true. For the focussing no such mathemetical rule can be applied; it is simply a matter of perception, and those only who have tried such work know how difficult it is. With the more pronounced portion of the picture it is easy enough, but in the deeper shadows and plain parts of the background there is little grip to be got; and, as the focus must be as equal all over as the lens will allow, something more marked is generally resorted to. A piece of printed paper is frequently used, but if moved from place to place much time is wasted in putting various portions out and in. Mr. Davies overcame this by fixing such pieces of printed matter at short distances all round the margin of the picture, and in this way was enabled to see at a glance the relative condition as to sharpness of every part.

Many and varied are the plans that have been proposed for the drying of sensitised tissue or plates. Here is one that is, to me at least, quite new, and which for cheapness and efficiency is equal to any that I have seen:—An upright box, four feet by three, the front of which is a light-tight door. The bottom is pierced in the centre by a hole four inches in diameter, and the top in the same way by one of one inch. Closely fitted into the opening in the bottom is a tube of sheet or tinned iron of the same diameter and eighteen inches long, where it expands to twelve inches for a length of a like distance. Here it contracts to four inches again, and in the form of a cone reaches the one-inch opening in the top. The box, which is provided with light-tight ventilators at top and bottom, stands on four feet, sufficiently high to admit of a large rose Bunsen burner or paraffine lamp being placed so that it shall burn a few inches up the tube, and the apparatus is complete. In this way a current of heated air is maintained, which, in consequence of the contraction of the upper end of the tube, fills the enlarged portion thereof, and from the whole surface sufficient heat is radiated for either plates or tissue, without the possibility of the drying atmosphere being contaminated with the products of combustion—a provision especially necessary in the case of sensitive tissue. To make the apparatus really complete it only needs a thermometer so arranged as to be read without opening the door, and then by increasing or diminishing the flame any required temperature could be steadily maintained.

John Nicol, Ph.D.

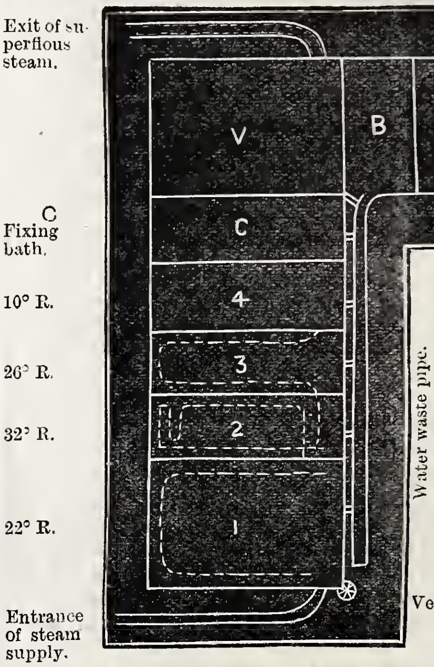
FOREIGN NOTES AND NEWS.

Dr. Reichard on the Uses of a Steam Engine in a Carbon Printing Establishment.—The *Wochenblatt* on Portraits which are not Likenesses.—The First Prosecution for Infringement of the New German Copyright Act.—Photography at Brussels.—On the Decoration of *Cartes-de-Visite* and Cabinet Portraits.—A German Photographers' Directory.

In the *Archiv* Dr. Reichard, of Maennendorf, has an article on the carbon process, in which he describes the arrangement of his tanks and how he makes use of steam in his establishment both in the form of steam power and for heating water and drying paper.

When he has sensitised his tissue he hangs it up, like albumenised paper, by the corners to dry in a room kept for the first two hours at a temperature of 16° R. (as when the temperature is higher the colouring matter is apt to drip off). For the succeeding four hours the temperature is raised to from 12° to 15° R., during the next four from 18° to 20° R., and during the last two it is lowered to 16° again. The drying of the paper is thus supposed to occupy twelve hours, and if this plan be carried out fully Dr. Reichard guarantees that there will be no failures in the prints traceable to this part of the preparation of the tissue. The temperature of the drying-room in his establishment is regulated by steam pipes which are completely under control.

In the washing-room the tanks are arranged as in the accompanying diagram:—



Each of the tanks is the size of a sheet of paper, is fifteen centimetres in depth, and holds exactly fifty litres of water.

N.B.—The tanks I., II., and III. are of the same size.

A. Zinc tank in which the prints are placed to soak when taken out of the printing-frame.
B. Porcelain tank containing the transfer paper (single transfer).
I. Zinc tank containing warm water of a temperature of 22° R.
II. ,, ,, ,, ,, 32° R.
III. ,, ,, ,, ,, 20° R.
IV. ,, ,, cold ,, ,, 10° R.
C. Fixing bath containing 10 litres of water and 250 grammes alum.
V. Washing up and developing tank.
Q. Glass plate upon which the squeegee is applied.

When all the tanks have been furnished with a sufficient quantity of water the operator turns on the steam to Nos. I., II., and III. until they are heated up to the required degree, which is, most probably, indicated by a thermometer fixed to some part of the interior of each tank. While the water in Nos. I., II., and III. is thus being prepared he goes to Q, and, taking up a print with his left hand, he dips into A, and at the same time lifts a piece of transfer-paper *b* with the right hand, putting into B. Both papers are kept under water until they have flattened out and begin to be soapy, when they are placed together, the prepared sides being next each other upon the glass plate Q. The operator, then, holding the papers in their place with the thumb and forefinger of his right hand, passes the squeegee across it from left to right. That the desired result of simultaneously detaching the gelatine film from the paper of the tissue and attaching it to the transfer paper, without causing either blisters or creases, may be safely accomplished by a single application of the squeegee, it is absolutely necessary that the pressure should be equal. This equality Dr. Reichard ensures by applying the squeegee pressure by steam power transmitted from a small steam engine. The pictures being properly squeegeed are placed in tank No. I., where the development only proceeds so far as that the transfer is floated off from the original support, and a considerable mass of pigment falls to the bottom of the tank. It is scarcely possible to assign an exact time for the prints to remain in each tank; but, taking the average, they may be removed at the end of five minutes to No. II., where they are left floating, face downwards, for another five minutes, and then, being pretty clear, they are removed to tank No. III. In No. III. they are left a couple of minutes or so until they are perfectly clear, and are only removed to be placed in cold water in No. IV.

In the tanks Nos. I., II., and III. three things have to be arranged for, namely, the clean cold water, the steam, and the waste pipe to carry off the dirty warm water. During the period of development there is a strong current of water in the tanks and a proportionately strong current of steam, which may be turned off or on to each tank by means of a cock. The steam is also controlled by means of the ventilator at X, and this facility of control makes it possible for two men to develope a thousand carbon prints in an afternoon.

From No. IV. the prints are placed in the alum fixing bath for five or six minutes, and after being moved about are removed to No. V., where they are washed up for half-an-hour in a current of fresh water previous to being dried. Dr. Reichard's steam engine is of English manufacture, and, besides feeding the steam boiler and the water reservoirs, it supplies the motive power to the burnisher and the squeegee.

The *Photographisches Wochenblätt*, in speaking of the frequency with which portraits are rejected—not on account of any technical failure in manipulation on the part of the operator, but because the portraits were not considered to be likenesses—thinks that photographers might do a little themselves to remove a fruitful cause of disputes by pointing out to their customers a frequent cause of failure, namely, that the unlikeness of portraits is generally the result of sitters not wearing their ordinary clothes, but coming more "dressed" than usual. This, besides giving an unfamiliar impression, helps to deepen the self-conscious and unnatural expression of countenance so often assumed by sitters in front of the camera. The *Wochenblätt* thinks that women are almost exclusively the offenders on this point. That may be left an open question, but that this matter of dress is a large factor in the failures in likenesses there can be no doubt. Of course the remark is not new, but it is one of those truisms which are often lost sight of and which will bear repetition.

The working of the German law of copyright is illustrated by the following story, taken from the *Archiv*, which gives an account of the first prosecution under the new act of the 10th January, 1876:—In the beginning of last year, Herr Hanfstängl, 69, Unter den Linden, Berlin, took a portrait of the Princess Charlotte, of Prussia, of which he printed and published great numbers. The defendant did the same, but furnished his prints at a tenth part of the price charged by the former, whereupon Herr Hanfstängl brought the present action for violation of his copyright. The defendant pleaded that, by the seventy-eighth section of the Copyright Act, the copyright of a portrait was vested in the sitter, unless any special agreement to the contrary had been made, and that, as Herr Hanfstängl had not obtained any formal authorisation to publish the portrait, he was incapacitated from bringing the action, as the copyright belonged to the Princess, and she alone could prosecute for its infringement. The judges took this last view of the case, and pronounced judgment accordingly; but Herr Hanfstängl appealed, and produced a document dated the 1st October, executed by the Princess's *ober-governante*, granting him the exclusive right of publishing the Princess Charlotte's portrait. The date was, however, long after the time when the complaint was made, and could not be held to have a retrospective action; besides which the judges thought it questionable whether the authorisation to be valid should not have been obtained from the Crown Prince. They, therefore, gave judgment in favour of the defendant.

A course of lectures on the theory and practice of photography, under which heading the carbon process is included, is given annually, under the auspices of the Belgian Government, in the *Musée d'Histoire Naturelle*, Brussels. The teacher is Professor Rommelaere, the Secretary of the Association Belge de Photographie, who has recently translated Capt. Abney's book into French for the use of his class, which is well attended by amateurs as well as professional men.

In the *Archiv* Herr Neidhart relates how he made a pleasant-looking picture of a portrait the plate of which was broken off short across the neck. He chose a white mat with a small oval opening coming pretty close round the head, but then too much of the white ground showed, so he added just outside the oval line a garland or arabesque of larch or heather twigs. The effect of the garland was so good that he prepared a number of other mats decorated with twigs of ivy, oak, pine, juniper, or with tufts of ferns, garlands of hop or of vine leaves interspersed with corn flowers, lily of the valley, and blue bells. Herr Neidhart's idea is not, however, so new as he, being an amateur, seems to imagine; for, not to mention the mats in which flowers and ferns in splash work are introduced, there are now many mats and albums ornamented by pictures of flowers in their natural colours, though the taste of this style of ornamentation is questionable. Ten or twelve years ago an attempt was made to introduce mats having several small ovals for *carte* portraits, the spaces between being filled up with chromos., in colours, of groups of birds, fruits, insects, &c., but the attempt did not meet with much success. Herr Neidhart, however, does not mention whether the flowers composing his garlands were natural flowers, or photographs, or etchings, or chromos., so it would not be fair to attack him as suggesting the admixture of a photograph in monochrome with the brilliant hues of flowers.

The *Deutschen Photographen Zeitung* intends to bring out a photographic directory, in which the name and address of every photographer conducting business on his own account in Germany, German-Austria, and Switzerland shall be found. The directory will also give the names of photolithographers, lichtdruck printers, and manufacturers and dealers in photographic goods. The publication, if well got up, is likely to supply a much-felt want.

Our Editorial Table.

A Treatise on Photography.

By W. de Wiveleslie Abney, F.R.S., Capt. R.E., &c.

London: Longmans, Green, and Co.

This volume forms one of the *Text-Books of Science* adapted for the use of artisans and students in public and science schools. Its aim, as stated in the preface, is chiefly to give a rational explanation of some of the different phenomena to be met with in photography, and with this to impart sufficient practical instruction to enable the student to produce a landscape picture which shall be technically good.

Its contents are varied. Commencing with a *brief* historical sketch, Captain Abney proceeds to describe a number of experiments with light, passing on to the theory of sensitive compounds and the action of light upon them. In the practical division of the book the various processes at present enjoying public favour are treated with sufficient fulness. The chapters on photo-spectroscopy and celestial photography are exceedingly interesting, and we shall take an early occasion to allude to them and other portions of the volume.

As Captain Abney's theoretical and practical skill in photography is so well known and appreciated this treatise will be received with much favour, although not a few English readers will blame the author for his having systematically ignored English weights and measures throughout the whole formulæ in the book, in every case substituting for them the *gramme, cubic centimetre,* and *litre* of our French neighbours. This, to many photographers, will mar the usefulness of the treatise as a work of reference, until they become familiar (as they ought to be) with the French system.

Illustrations of Gabriel Grub. By F. York.

It may be asked—Who is, or was, Gabriel Grub? We reply, on the authority of one of the characters in Dickens's *Pickwick Papers*, that he was a sexton who was stolen by certain goblins. The story is especially adapted for Christmas parties, and Mr. York has very cleverly illustrated the various adventures of the morose and unhappy sexton by photographs from life. They were recently exhibited, as transparencies, by the magic lantern in the large room of the House of the Society of Arts, on the occasion of the "popular" meeting of the South London Photographic Society, when they elicited much applause. Among the pictures, or slides, is a scene in a cavern that is very effective. A dark cloud, which is situated in the farther end of the cavern, is seen to roll away and to disclose a number of domestic scenes depicted with great vividness. Of these cavern effects there are no fewer than six, the method of producing them on the screen being well known to the exhibitors of "dissolving" views. We may state that *Keevil's* lantern, by which the effects were exhibited upon the occasion to which we have alluded, showed to great advantage and proved its suitability for such duplex exhibitions of pictures, as well as for producing the ordinary dissolving effects. The grouping and general composition of these views are excellent, and we commend them to our readers.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Feb. 4	West Riding of Yorkshire......	Oddfellows' Hall, Bradford.
,, 6	Edinburgh	5, St. Andrew-square.
,, 6	Bristol Amateur	Museum, Queen's-road.
,, 6	Photographers' Benevolent	160A, Aldersgate-street, E.C.
,, 7	South London	John-street, Adelphi.

BERLIN PHOTOGRAPHIC SOCIETY.

This Society met on the 7th December last,—Dr. Vogel occupying the chair.

Herr Schwier, the President of the German Photographic Society, sent a copy of the *Deutschen Photographen Zeitung*, the new organ of that Society, which was laid upon the table, along with Professor Steinhauser's *Treatise on the Mathematical Relation between the Stereoscope and its Pictures*, and a work by Herr José de Rodriguez, Director-in-Chief of the Photographic Section of the Geographical Surveys in Portugal, giving interesting details as to the works carried on under his direction, which are comprised under the heads of "Photolithography," "Photozincography," "Heliogravure," and "Photography."

Some Japanese filter paper was then laid upon the table, and recommended by the President for use in filtering collodion.

Herr Bergemann expressed himself as agreeing perfectly, in consequence of certain experiments, with the previous speaker, but had found that it did not suit for filtering silver baths, and he had not, therefore, seen his way to placing it amongst his stores.

Some of the other members present thought it would be important to get a paper suitable for filtering collodion, even if it did not answer for other purposes, since the filtration of that fluid through cotton wool was a tedious process.

Lichtdrucks by Herren Schober and Baeckmann and by Herr Frisch, were laid upon the table, and Herr Bergemann read the programme of a projected industrial exhibition to be held at Berlin in 1879. The question as to whether the project should be supported by the photographic society gave rise to a lively discussion, and was finally decided affirmatively, the President being requested to place himself in communication with the exhibition committee.

A provincial member sent some silver prints having peculiar matt spots on their surface where the albumen seemed to have disappeared, and he asked if any one could tell him the cause.

Herr Liebmann said he had observed similar flaws in quite freshly-albumenised paper most frequently, especially in the cold season, and when the bath was weak and somewhat acid.

The President said that Mr. Warnerke had experimented with his emulsion—which he credited with greater sensitiveness than dry plates—in his (the President's) studio. There Mr. Warnerke obtained a picture on a plate coated with emulsion, but *not dried*, in about a third of the time required for the exposure of a wet plate. The object was a white plaster figure placed upon a black stand. However, it was only the light plaster that had an action upon the emulsion corresponding to that upon the wet plate; the dark stand, on the contrary, appeared absolutely without action. Thus for dark objects an emulsion appeared less sensitive than a wet plate. Mr. Warnerke used the developer very strong; that is, a saturated solution of carbonate of ammonia, to which was added a proportionately large quantity of bromide of potassium and pyrogallic acid. He (the President) was of opinion that the emulsion, even if it were not equal to wet plates, was, at anyrate, considerably more sensitive than any of those he had as yet tried. The President then laid on the table some of the original photographs, negative and positive, by Professor Draper, by means of which the latter was led to the discovery of oxygen in the sun.

Herr Reichard exhibited a number of negatives in which the well-known rents in the varnish were present in remarkably large numbers. He wished to know the reason of this phenomenon, as well as the means of preventing it. He stated that in all his experience, which extended over many years, he had always been free from varnish rents until now, and that the fault had suddenly made its appearance with a rush in pictures taken scarcely six months since. He had even remarked it in plates taken but a few weeks ago. He also mentioned that the quality of the glass, of the collodion, of the varnish, &c., used was the same as in former years, or, at least, that he always got them from the same sources.

No member present was able to suggest a perfectly satisfactory explanation.

The President thought perhaps the varnish furnished was not always of the same quality, and that it ought to bear the blame. In the preparation of varnish bleached shellac was used, which was often more or less affected by the bleaching agent. Sometimes it was rendered very brittle and imparted that property to the varnish film. He advised the choice of another varnish, and recommended Besler's, which had never shown rents in his hands.

Herr Reichard remarked that for about the last eight days he had used Besler's varnish, and as yet, at least, the plates varnished with it had remained free from rents.

Herr Boll remarked that the glass ought to bear part of the blame. With one and the same varnish he had got rents in the varnish continually when using one kind of glass, while with another sort of glass the same varnish showed no rents.

Herr Reichard said he always used the same sort of glass. He also added that, before varnishing, he coated his plates with dextrine—a proceeding recommended by the varnish commissioners as a very effective preservative againt rents—and that, in spite of all, the rents were there.

Herr Prümm questioned the quality of the dextrine and the concentration of the solution used.

Herr Reichard replied that the dextrine solution he used was not stronger than a proportion of 1 to 16.

Herr Quidde warned him against the use of blue-green plate glass, as with such glass he almost always got rents.

It may be remarked here that the rents in the plates shown by Herr Reichard were broader than usual, without forming the well-known moles' burrows, and that they do not disappear either by rubbing or heating.

The President observed that, in the case of the plates taken in Egypt, those in which the sky was covered with colour rents appeared, but only upon the coloured part of the film, the difference between that part of the plate and the rest being as distinct as if it had been cut off. A dilute solution of gum (1 to 50) streaked over the varnish film and then rubbed half dry with cotton wool proved a very good protection to those plates.

The discussion here ended, and the meeting was adjourned.

VIENNA PHOTOGRAPHIC SOCIETY.

This Society met on the 6th November last. In the absence of Dr. Hornig the chair was occupied by Herr Melingo, who laid upon the table two photochromes sent by M. Vidal, the subjects being metal work.

A communication from Herr Birfelder, of Bern, upon Professor Husnik's paper, was then read, after which,

The Chairman directed attention to a collection of reproductions of old copperplates, by Herr Obernetter, and stated that the works of three competitors for the prizes offered by the Society had been received. One competed for the prize offered for *genre* pictures; the second for that offered for a series of lantern slides to assist instruction in natural history, art, or technical subjects; and the third made a bid for the prize offered for a critical study of the reactions of chromic acid and its salts upon organic substances.—Herren C. Haack and V. Angerer were chosen judges.

A collection of coloured landscapes and animal studies in Japan were laid upon the table by Baron von Stillfried. These pictures were photographs, not very deeply printed upon a special sort of paper, and then worked up in water-colours.

Baron von Stillfried asked whether those pictures could be sold as water-colours, the photograph being a mere outline.

Herr Kramer thought they might, as the public would buy them more readily than as painted-up phothographs.

Herr Luckhardt said truth was always best, and if those were sold as water-colours, and the photographic groundwork were to fade, the imposition would soon come to light.

The Chairman agreed with Herr Kramer's opinion, as the water-colour was the really artistic part of the production.

The Chairman laid on the table a translation, by Dr. J. Schnauss, of Mr. Heighway's *Practical Portrait Photography.*

A discussion followed on the Austrian law of copyright, and the meeting was shortly afterwards adjourned.

FRANKFORT-ON-MAINE PHOTOGRAPHIC SOCIETY.

The first ordinary meeting of this Society for the session was held on the 19th November last,—the newly-elected President, Herr Hartmann, being in the chair. The minutes of the annual general meeting having been read and approved.

Dr. Schleussner made some observations as a mark of respect to the memory of the late Mr. Fox Talbot.

Herr Hartmann took the opportunity of proposing that a collection of articles be made illustrating the progress of photography from its first discovery to the present day.

On the matter being put to the vote, Herr Hartmann was commissioned to carry out the realisation of his own idea.

Dr. Schleussner read a letter from Herr Krüger, the Secretary of the German Photographic Society in New York, expressing the good wishes of that society, and arranging for an interchange of intelligence with the Frankfort society.

Herr Hetzler showed a collection of stereoscopic photographs taken by himself in Australia fifteen years ago. They were taken on dry plates, some of which were supplied by the London Stereoscopic Company, some prepared by an albumen process, and some prepared by Herr Hetzler himself by the Fothergill process. He (Herr Hetzler) then related how each of the various processes had gradually developed, and that glycerine was first used as a preservative, then honey and albumen, and so on, and how useful the dry-plate processes are in countries where every convenience is lacking.

A discussion on the various advantages of the wet and dry processes concluded the proceedings.

The same Society met again on the 3rd December last,—Herr Geldmacher occupying the chair. At this meeting the guest of the evening was Herr Baumann, President of the Cologne Society. After the minutes of the previous meeting had been read,

Dr. Stein spoke at some length in praise of Wilde's dry plates and their suitability for taking microphotographs and physiological photographs. For both purposes he generally employed direct sunlight, when he required but one second's exposure to get a sharp, powerful picture.

Herr Geldmacher laid on the table a collection of microphotographs by Herr Grimm, of Offenburg, and a design for the members' diploma, drawn by Herr Hartmann. The latter was greatly approved of, and it was resolved to have the requisite number of copies printed off the size of a cabinet picture.

Dr. Stein then made some remarks on the effects produced by different coloured lights upon mental disorders—to the effect that, though the physical and chemical action of the spectral colours upon plants had long been known, it was but lately that any specific action upon human beings had been recognised, further than that sunshine cheered and gloom depressed. Two years ago an Italian physician, Dr. Ponza, observed that red light had an enlivening and blue light a depressing influence upon lunatics; so he had three rooms prepared, the window of one being glazed with blue glass, one with violet, and one with red glass. In the red chamber patients with a tendency to melancholy were confined, and in the blue or violet rooms unruly patients, according to their degree of violence. The effect was that, after being in the red room for a few hours, melancholy patients, who for weeks had refused to take proper nourishment, began to eat; while the violent patients soon became quiet when confined in the blue room. Dr. Davies, of Maidstone, is also said to have successfully experimented with blue light upon unruly patients.

Herr Baumann then presented the greetings of the Photographic Society of Cologne, and thanked the members of the Frankfort Society for the kind reception they had accorded him. The meeting was then adjourned.

RHEINISH-WESTPHALIAN PHOTOGRAPHIC SOCIETY.

This Society met on the 16th November last,—Herr Baumann in the chair.

A letter was read from the Secretary of the German Photographic Society of New York, in which he said, amongst other things, that paper albumenised on both sides was not used there because the film which is not sensitised dissolves off. (This paper albumenised on both sides had been recommended as a cure for blisters.) There the usual way of preventing blisters was to wash the prints well and leave them for some time in water acidified with acetic acid, from which they were transferred direct to the toning bath; and as each print was toned it was placed in salt and water until the whole batch was ready to be removed into the fixing bath. The soda solution was usually one to twelve in summer and one to ten in winter. When fixed the prints were placed first in a strong solution of salt and water, then in a weaker, and finally washed up as usual.

To the question—"How does common salt prevent blisters?"

Herr Ehrmann replied that it gave the water the same specific gravity as the soda solution. He (Herr Ehrmann) thought it was important that the water and the *hypo.* solution should be of the same temperature.

The Chairman showed some pictures printed upon paper, prepared by Schleicher and Schüll, of Düren, from old ropes. When sent out of the manufactory this paper contained a small quantity of salt, and when silvered it furnished a faint picture suitable for painting upon.

A lively discussion on the foregoing subjects closed the meeting.

Correspondence.

STEREOSCOPIC TRANSPARENCIES.

To the Editors.

Gentlemen,—With reference to Mr. J. Harmer's communication in The British Journal of Photography of the 25th inst., I can only say I was not aware of that gentleman's existence. I have heard Mr. Breese mention his name, saying at the same time that he was the only man besides himself who knew anything whatever about combination printing for the stereoscope; but he repeatedly gave me to understand that he did not tell Mr. Harmer more than he could help. As Mr. Breese had evidently had some misunderstanding with Mr. Harmer I never pressed Mr. Breese on the subject of Mr. Harmer's connection with him.

I at one time thought seriously of advertising for Mr. Harmer, with a view of making terms with him (if possible) to assist me in publishing stereoscopic transparencies, taking Mr. Breese's negatives as a nucleus to start with, but the idea fell through. Mr. Breese either could not or would not give me any clue to finding Mr. Harmer, and I concluded, as he had not been heard of, that either he had left the country or that he was no longer in existence; for, so enthusiastic have I been with regard to these slides, that I could not bring myself to believe it possible that a man possessing the information necessary to their production would have failed to make use of it in some way—commercially, if so inclined; and, failing that, he would, in the interests of science and art, make the information known for the benefit of others. But Mr. Harmer, no doubt, had his reasons for silence on the subject, and I am quite willing to credit him with the very best intentions.

Judging from a first perusal of Mr. Harmer's letter he evidently has a very intimate and practical knowledge of the subject in hand. I do not purpose dealing with the letter now, as it is probable I may refer to it in my next paper. A good deal of the information I intended to give Mr. Harmer has forestalled me in; but that I do not mind so long as the information gets into the right quarters and results in reviving the interest in stereoscopic work. I neither seek nor do I desire any *kudos* in bringing the subject before the photographic world. I was asked to give a paper, and the subject I chose was, naturally enough, the one I take most interest in, and the one I know most about, as far as photography is concerned.

There are two points I should like to notice in Mr. Harmer's letter before I conclude. He deliberately says that Mr. Oakes's description of Mr. Breese's method of colouring is not correct. I beg to say that it is correct as far as my description goes. I described from memory the slide painted for me by Mr. Breese. I saw him paint it, and the method he adopted in colouring it was as I have described. I am satisfied that Mr. Harmer's account of the way he coloured the original slide is also correct. It is just the way Mr. Breese would go to work, and is very characteristic of him.

The other point I wish to notice is that mentioned in Mr. Harmer's closing paragraph, in which he calls me to account for an expression I used—an expression, as he says, hackneyed in photographic literature. This fact speaks for itself, and proves that it must have had some foundation; but I withdraw it so far as I am concerned. I have no wish to be otherwise than kind and courteous, and I do not know that I had any special meaning in making use of it.

In conclusion: I can only say I am very glad Mr. Harmer has made us acquainted with his existence, and I trust I may look upon him as a powerful ally in reviving the interest in stereoscopic work.—I am, yours, &c. S. H. Ashley Oakes.

16, *Silverwell-street, Bolton, January*, 26, 1878.

[We, too, join with Mr. Oakes in expressing the hope that Mr. Harmer will continue his most interesting account of Mr. Breese's method of working.—Eds.]

IMPROVEMENTS IN CARBON PRINTING.

To the Editors.

Gentlemen,—I greatly regret that in my article in your last Almanac I should have written aught to offend the gentlemen of the Autotype Company, whom I greatly respect.

That article contains two chief propositions, both of which—in spite of the verbal inaccuracy of my quotation, made, as stated, from memory, and, therefore, erroneously put between inverted commas; in spite, also, of the indignant tone of the writer of the letter in the last number of your Journal—I believe to be strictly true, and I still maintain them:—

1. The first proposition is that up to a very recent period the manufacturers of pigment paper were unable to obtain certain tints in permanent colour, and appeared to think the problem unsolvable, as they had stated publicly that a fugitive colour must be employed.

2. That I had succeeded, after a long course of experiment, in rendering such tints perfectly permanent by a process which I had recorded by a patent.

It appears to me that the Autotype Company fully admit the accuracy of the first proposition. When quoting from the sixth edition of their *Manual* they say:—"Up to a very late period the more brilliant tints in the autotype tissues could not be obtained except by the use of cochineal colour."

With regard to the second proposition, I cannot see in what way the Company are prejudiced by it. Do they dispute the priority of my publication of the process, by which this important question has been solved?

I have no doubt that the Company possess many imperfect attempts of mine to solve this problem. If a minute history of the invention be interesting to the public, why not communicate to the journals the substance of our interviews in Paris, in 1876, the particulars of which were subsequently recorded in a written memorandum by Mr. J. R. Sawyer?—I am, yours, &c., J. R. Johnson.

January 29, 1878.

"A TRIAL OF LANTERNS."

To the Editors.

Gentlemen,—In justice to the manufacturers of the "pyro-hydrogen light" I must ask you to kindly insert the following remarks in reference to the trial of lanterns at the last meeting of the Bristol and West of England Amateur Photographic Association, a report of which meeting was given in your issue of January 18th.

From the report, as given, it would appear that the pyro-hydrogen light was inferior to the light of the other two lamps, namely, the sciopticon and Newton's refulgent. This statement, though in one sense correct, is, through the omission of certain important particulars, anything but correct and somewhat misleading.

In the first place, I may say that the sciopticon and also Newton's refulgent lamp were both used in lanterns having for the object-lenses French quarter-plate portrait combinations, having a diameter of about $1\frac{5}{8}$ inch, and were worked *with full aperture.* The pyro-hydrogen light was worked with lenses having a fixed diaphragm of $\frac{3}{4}$ inch. This alone would account for a vast loss of light. In the second place, the pyro. light was used in a lantern to which the jet had not been fitted, and, consequently, the light could not be moved into the correct focus of the condensers, and, also, not being fitted with the requisite adjustment for height, could not be correctly centered, thus placing the light at a manifest disadvantage.

Through an oversight on the part of the optician in omitting to send an adapting tube with the lenses, an additional combination had to be screwed in, in a position where it was not correctly placed. Taking these facts into consideration the only wonder is that the light compared as favourably as it did with the others. Having had the adjustments and necessary alterations made, the light is wonderfully improved, and gives great satisfaction.

I should also add that through some slight disarrangement of the glasses the refulgent lamp was not working at its best, and, though the sciopticon on that occasion gave the better light of the two, the light of the refulgent is certainly more evenly diffused over the disc. My desire to do justice to a clever and really useful invention is my reason for troubling you to insert this communication.—I am, yours, &c.,

Bristol, January 30, 1878. EDWARD BRIGHTMAN.

EXCHANGE COLUMN.

Wanted, a whole-plate camera, in exchange for a musical album.—Address, M. W., 5, Keith-terrace, High-road, Lee, London, S.E.

Ten quires albumenised paper, solar camera, stereo. camera, and changing-box by Meagher will be exchanged for Tench's No. 1 baby lens and paraffine stove.—Address, JAMES ARTHUR, 11, Grove-terrace, Victoria Park, London.

Wanted, a good *carte* camera, with repeating back and rack-and-pinion movement, in exchange for coloured lantern slides (Scripture subjects) by Carpenter and Wesley.—Address, F. SHAW, Willowby-street, New Lenton, Nottingham.

ANSWERS TO CORRESPONDENTS.

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

JAS. B.—Try formula No. 2.

F. A.—We have forwarded the enclosure.

R. O.—No registration in your case is required.

J. R.—We believe the advertisement to be a *bonâ fide* affair, but we are not acquainted with the formula.

T. M. G. D.—When we give the new method of making oxygen a trial we shall communicate the result.

F. G. P.—With respect to the purely legal aspect of the question of Sunday photography we must refer you to a solicitor.

H. A. S.—The article was written by the second on your list. It contains internal evidence of this having been the case.

MORNING (Leeds).—A *brochure* sold at a penny or twopence by a dealer in the provinces will give you all the information required.

W. W.—It is probable that simple filtration, followed by the addition of a *little* acetic acid, will re-establish the good working qualities of the bath.

N. A. C.—Unless made acquainted with some of the details in connection with your method of working we could not offer any suggestion as to the cause of the fog.

INCORRECT EQUATIONS.—Mr. Herbert B. Berkeley directs our attention to a printer's error that occurs in an equation in his article in last number. Instead of "$2\ Ag_3\ Br_2$" *read* "$2\ Ag_2\ Br$."

ONCE GULLED.—Certainly; by calling at our office we shall have the greatest pleasure in showing you carbon prints by the Autotype Company, and also specimens of heliochromy by M. Leon Vidal.

TRAVELLER.—Select a lens that will not distort; do not let it include too wide an angle; place your camera quite level; and make use of a small stop—say a fortieth of the focus of the lens. These are all the conditions required.

J. J. B.—The studio is too short. As this cannot now be rectified you must obtain a *carte* lens much shorter in focus than the one you are at present using. In this way you will be enabled to obtain full-length portraits of your clients.

COLLO.—Your method of roughening the edges of plates is rather too elaborate. Obtain at a warehouse devoted to furnishing materials for the boot and shoe trade a square slab of sandstone prepared for sharpening knives, and use that for removing the sharp edges of the glass plates.

F. BRUCE.—Had you read your letter after finishing it you ought to have been in a position to have deduced this law—a strong solution of nitrate of silver coagulates the albumenous coating of printing paper, whereas much of that albumen is dissolved by a *weak* solution of this salt. Think over this, make one more experiment, and write again.

SIMEON.—To restore the nitrate bath try, first of all, the addition of a few drops (per ounce) of a solution of bicarbonate of soda. If it be still intractable expose it (in a neutral or alkaline condition) to light for a day or two. You may even boil it. Should none of these measures prove remedial apply a strong solution of chloride of sodium to precipitate the silver.

GEO. SMITH.—To remove the cracks in negatives, or rather to prevent them from being seen, take a pledget of cotton wool, charge it with fine lampblack and rub well over the surface of the negative. The following method has been suggested: charge a camel's-hair brush with Prussian blue and run it over the cracks; when dry breathe upon it and wipe off the superfluous colour.

X. Y. Z.—Your best method for making paper negatives is to closely follow the directions given in manuals, especially those published fifteen or twenty years ago, containing an account of the waxed-paper process. To check the development of a collodion plate apply diluted golden syrup containing acetic acid. To keep wet plates good for a few hours prepare them by the glycerine process.

J. HENDERSON.—We willingly agree with your statement that the process possessed much promise, but beyond that we cannot at present go. There is no use, however, in wasting time ruminating over what might have been; the process has been superseded by something so much better that no one, unless he possess "antediluvian" proclivities, would now think of having recourse to it.

G. F. B. S.—Before we can give a description of the *camera lucida* we must know which one is meant. There are three or four very effective methods of forming instruments of this kind, commencing with the prism of Wollaston, which for your purpose we do not think quite the best. Please write more plainly, and describe in a more lucid manner the precise nature of your requirements.

P. R. H.—Depend upon it you will waste far more time in trying to get rid of the reticulation of the film than the collodion is worth. If it arise from the presence of water, this can very easily be eliminated by the sulphuric acid and bell-glass experiment you suggest; but there are so many other causes that we advise you to pour the whole of your collodion into your waste receptacle, and recover the ether by distillation.

"GOLD" (Dartmouth).—When a solution of protosulphate of iron is poured into a solution containing chloride of gold the precious metal is precipitated as a fine powder of a reddish colour. This method is frequently employed when chemically-pure gold is wanted. Although the precipitate is of a dull appearance, it acquires a metallic lustre by friction or heat. To convert this powder into a solid lump nothing more is required than fusing it, having previously added a little borax. If you desire to convert it into chloride of gold it will not be necessary to fuse it, as it will dissolve more readily when in the state of fine division. After washing the precipitate, to ensure the removal of the iron, place it in a test tube of suitable capacity and add, in small quantities at a time, sufficient *aqua regia* to effect its dissolution.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The next meeting of this Society will take place on Thursday next, the 7th inst., in the Rooms of the Society of Arts, Adelphi, when a discussion will take place on Mr. Pearsall's paper—*Educational Aid by Photographic Exhibits.*

HONOUR TO A PHOTOGRAPHER.—We are glad to perceive from the *Philadelphia Public Ledger* that Mr. Frederick Gutekunst, of Philadelphia, photographer, has been distinguished as the recipient of the Cross of the Knights of the Austrian Order of Franz-Joseph, conferred by the Emperor of Austria on Mr. Gutekunst, on account of the excellence of his productions in photographic art. Distinctions are well bestowed when made for such reasons as have brought decoration to Mr. Gutekunst.

OBITUARIES.—MM. BECQUEREL AND REGNAULT.—The world of science has lost one of its most distinguished members—M. Antoine Becquerel. M. Becquerel was formerly an officer of the Engineers under Napoleon I., who presented him with the cross of Chevalier of the Legion of Honour in 1812. Fifteen years ago he was promoted to the rank of Commander in the same order. His labours—those upon electro-chemistry among others—gained him in 1874, from the French Academy of Sciences, the half-century members' medal of that learned body. He had also obtained the Copley medal, which England had bestowed on only three French *savants.* M. Becquerel had been professor in the National Museum of Natural History since 1838, and was the clever father of an able son, M. Edmond Becquerel, whose copies of the solar spectra and subjects in natural colours direct from the object—labours dating from 1848 and 1849—will be well remembered, as well as those on exciting and continuating rays, and also on chromic acid compounds.——The illustrious physician and chemist, M. Regnault, died at Auteuil, at the age of sixty-eight years, on the 19th inst. M. Regnault was Engineer-in-Chief of Mines, and was successively Professor of Physic at the College of France and of Chemistry at the Ecole Polytechnique, member of the Academy of Sciences, Director of the Manufactory of Sevres, and President and Honorary President of the Photographic Society of France, to which latter body he had rendered many services. By a singular coincidence M. Regnault departed this life on the day of the anniversary of the battle of Buzenval, in which his son, Henri Regnault, the painter, already celebrated, fell mortally struck by a ball in the Franco-German war.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 927. Vol. XXV.—FEBRUARY 8, 1878.

ON THE DECAY OF STEREOSCOPIC PHOTOGRAPHY.

As Mr. S. H. A. Oakes has announced his intention of publishing the whole of the *modus operandi* of the late Mr. Breese in the production of his justly-celebrated stereoscopic transparencies, and Mr. Harmer has since followed with an instalment of information upon the same subject, it may not be amiss if we say a few words upon some of the causes which have most probably operated to bring about the waning interest in that branch of our art which it is Mr. Oakes's desire to revive, namely, stereoscopic photography.

Mr. Breese's work lay in a special direction; at least those of his productions to which he was mainly indebted for his reputation belong to a distinct branch of photography very little, if at all, worked by anyone else. Though his name is identified with stereoscopic work and with transparencies, it is in the direction of combination printing in connection with the stereoscope that we must look for his speciality, and in which he stood, and to the present day his name remains, alone. It is by popularising this special branch and by placing in the hands of photographers generally the means, hitherto kept secret, by which the various effects are produced that Mr. Oakes hopes to revive the feeling in favour of a description of picture which may be said to have almost disappeared. We remarked, a week or two back, that if anything is calculated to effect that object it is the method Mr. Oakes proposes to adopt; we doubt, however, on second thoughts, whether we were strictly correct in that statement. We fully admit that the production of the class of picture under notice in a popular form and at a reasonable cost would have a great effect upon the non-photographic portion of the community; but how are we to get at the photographers and secure the production?

There is no gainsaying the fact that of late years the stereoscope has declined in popular favour, and the question is—"What is the cause of that decline?" It has been supposed by some to be owing to "the novelty having worn off." On the same grounds we might expect to find photography itself annually narrowing its sphere instead of each succeeding year finding some new application, some fresh votaries. It is true that popular feeling catches eagerly at anything new, to throw it off again as soon as it is found to be worthless; but it is equally true the public are staunch in its support of any novelty which may prove upon a closer acquaintance to deserve it. In what respect, then, has the stereoscope failed to satisfy its patrons—the public generally and photographers particularly? In other words, to what causes are we to ascribe its decline in popularity?

In replying to this question we have to strike an "all round" blow; we hold the stereoscope itself blameless, and lay the onus upon the manufacturers of the instrument, upon the producers of the pictures, and lastly upon the public themselves. The stereoscope, when properly constructed, we look upon not as a mere scientific *toy*, as it is considered by many, but as an instrument capable of numerous applications—scientific, artistic, and educational; and when, from faulty construction, it fails in its application we must lay the failure to the charge of the maker and not of the instrument. Photographers, with a few honourable exceptions, have much to answer for in alienating the popular taste by flooding the market with imperfect, inartistic, and trashy "slides"—got up in a double sense to "sell"—while the public themselves, by accepting, as a standard, "rubbish" against which their better taste must eventually revolt, have voluntarily assumed a large proportion of the blame.

It is scarcely our province to deal with the question as it affects the manufacturers of the instrument, but having laid a charge at their door we are bound to substantiate it. The best-made English stereoscopes are no doubt nearly perfect as regards workmanship; but we require an alteration in the shape and style of the instrument in order that it may be used with ease and comfort. With the form in ordinary use much craning of the neck is necessary in order to secure even a moderately equal illumination of the picture. Another point which has undergone frequent discussion is the correct distance apart of the lenses. This is a matter which varies very greatly with individuals, and to a smaller extent with the distance of the centres of the pictures; but by far the larger number of instruments are constructed as if the eyes of different individuals and the centres of all pictures were placed at an unvarying distance—conditions which, we need scarcely say, do not exist. As an instance of a fortunately less frequent fault in construction we may mention an incident which came under our notice. We possess a cheap folding stereoscope which we find extremely useful and of greater convenience than the more elaborate form when mounting "slides." A non-scientific friend purchased one of the same pattern, which was submitted to us for examination, as it "would not work." This rough description of its powers was certainly correct, and arose, we subsequently found, from a variation of *more than half an inch* in the focus of the two lenses.

If we turn to the shortcomings of photographers we must recognise two distinct classes—commercial and amateur. The influence of the former class has tended to degrade the stereoscope in the eyes of the non-photographic section of the public; while the latter have apparently succeeded in disgusting themselves with their own work, and hence have discarded stereo. work altogether. Looking at the commercial side of the question, we are happily able to say that the evil has almost uprooted itself. The propagators of "trash" by disgusting the public have destroyed their market, and consequently the supply has ceased. In a few shop windows we may still see some of the "old stock" struggling to obtain a sale; but it is chiefly in private collections that we find in all their "ghastly beauty" specimens which raise a feeling of wonder as to how any one could ever have been induced to invest money in such rubbish. Let us hope that, should the stereoscope be reinstated in favour, the public taste may now be sufficiently educated to reject such work should the supply recommence.

We will now turn to the side of the question which more immediately affects the decreased production of stereoscopic pictures by amateurs. It has been urged in explanation of the waning interest in that class of work amongst amateurs that it is owing to a taste for pictures of larger sizes; but this, for various reasons, we cannot believe to be the case. Of late years the tendency has been rather in the opposite direction, and cameras of the "pocket" size have been more in vogue than larger ones. It may be said that the pocket camera is only a roundabout way of obtaining a large picture by subsequent enlargement; but we would ask in how many cases are the original small negatives so utilised? Again: the number of amateurs who confine themselves to large work is comparatively small, while those who occasionally utilise the larger sizes will be found to do the bulk of their work upon a smaller scale—generally one of the "cabinet" (or $7\frac{1}{4} \times 4\frac{1}{2}$ to 8×5) sizes.

It is to the introduction of the latter useful form of camera that we are disposed to ascribe, in a great measure, the falling off in the production of stereoscopic work. This statement may, at first sight, appear somewhat extraordinary when it is considered that these cameras are invariably constructed to give the option of a stereo. or single picture upon the same sized plate; but we shall attempt to show how, in several ways, the new size of plate has tended to the suppression of stereoscopic work. In the first place, it cannot be doubted that the large plates enable us, without difficulty or special care, to turn out stereo. prints of full size without any fear of stained or torn edges, whereas skilful and cleanly manipulation were absolutely necessary with the old $6\frac{3}{4} \times 3\frac{1}{4}$ plate. But, on the other hand, when we consider that the actual portion of the film utilised measures only some 6×3 inches, it is obvious that the new size is not economical; and though probably few amateurs would in a general way make that an obstacle, we can readily believe that under some circumstances it may militate against the production of stereos. Suppose, for instance, a photographer is out for a holiday (be it a day or a month) with one of these cameras and a limited supply of plates: he considers that, *cæteris paribus*, a single negative upon the full-sized plate is of greater value than a stereo., and hence he is reluctant to "waste" a plate on the latter form of negative when he can as easily obtain the more valuable. Of course, with a plentiful supply of plates, or when the choice of subject is limited, this argument would not apply, as the views might then, with advantage, be "duplicated;" but we rather fancy, from our own experience, that the habit of neglecting stereo. work grows upon one. We have known more than one amateur of our acquaintance to go on a photographic tour of some duration, fully "armed" for both stereo. and single work, and to return with a portion of the plates unexposed and not a single stereo. picture taken.

Looking at another phase of the same question: the new size is apt to, and indeed does, lead to the production of stereo. negatives badly composed and altogether unsuited to the purpose for which they are required. Many photographers are in the habit of trusting entirely to the judgment in composing the picture on the focussing-screen, neglecting altogether to consider how much of the subject then depicted will come within the bounds of a stereo. print. In this manner are produced dozens upon dozens of stereo. negatives, technically perfect, perhaps, if only the size of the print were immaterial, but which, when cut down to the inexorable limits of the stereoscope, are found to be wholly ruined as pictures. The use of longer-focussed lenses (six, seven, and even eight inches) than were formerly employed in stereoscopic work tends to increase the liability to error in this direction. Such lenses give undoubtedly a more natural-looking picture in distant landscape work; but the fact must not be lost sight of that, though upon a comparatively large plate the picture obtained may "compose" well, yet when the size of the plate is considerably curtailed, or when the print is cut to stereo. size, the angle of view included is, in the majority of cases, far too small to give a satisfactory pictorial result. We have in our recollection as we write a series of stereo. views of one of our English abbeys, taken upon 8×5 plates, with lenses of six inches focus. As *negatives* they were simply all that could be desired; as *stereo. negatives* utterly useless, except for reduction in the camera. The obvious way out of this difficulty is to mark upon the ground glass the extreme limits of the stereo. prints, and in composing the picture to adhere rigidly to those limits; also to suit the focus of the lens to the subject.

We might bring forward further arguments of the same character, but we have said sufficient to point out an unsuspected cause of the failing interest in the stereoscope. It is tolerably evident that the constant production of unsatisfactory pictures—especially when, as in this case, the cause is not at once plain—will gradually alienate the taste for stereo. work, and the same remark will apply to pictures defective from other causes. Under the latter head we may include want of judgment in the choice of subjects and carelessness in cutting and mounting the prints, all of which have had their share in bringing stereoscopic photography to its present low ebb.

Mr. Oakes has our hearty co-operation in his crusade in favour of the stereoscope; and while we do not anticipate that the bulk of our amateurs will be ready to face the difficulties of combination printing, we have no doubt that he will find some at least to follow him. But we do trust and believe that he will succeed in his object—the revival of an undeservedly-neglected branch of photography.

THE NEW IRON DEVELOPER.

When we last drew attention to the ferrous oxalate developer our experiments with it had been confined to collodion dry plates. Since that period we have been making use of it in connection with gelatino-bromide plates, with the happiest results.

The advantages secured are a lessening of the exposure, and a particular kind of hardening of the film, in virtue of which it appears to stand the roughest treatment without frilling or puckering. These properties have also been found by others, notably so by Dr. Huggins, F.R.S., a letter from whom on this subject we append:—

"In connection with your reference to iron development with dry plates, it may interest your readers to know that as soon as Mr. M. Carey Lea's paper reached this country I made some careful comparisons of the new iron development with the usual alkali method. My experiments were made chiefly with Kennett's gelatine plates.

"After exposure the plate was cut in half with a diamond, one half subjected to the iron development, and the other half developed in the usual way. The result was also in favour of Mr. Lea's method, but very greatly so when the exposure of the plate had been made purposely too short. The pictures obtained by the iron method appeared to me to possess very great delicacy of detail and half-tone.

"A very important advantage of this method arises from the freedom from all risk of fogging the plate; and this property of the iron method is of especial value when it is endeavoured to make up for insufficient exposure by a stronger and more prolonged development.

"The *neutral* oxalate of potash and the oxalate of iron can be obtained at the establishment of Hopkin and Williams. A saturated solution of oxalate of potash is made by means of heat, and into this hot solution the oxalate of iron in powder is dropped until it is no longer dissolved. The solution of the oxalate of iron to be assisted by stirring. This deep-red solution is filtered when cool, and may be used in the concentrated form, or more or less diluted, according to the amount of exposure to which the plate has been subjected."

The frilling of the gelatine film has given rise to a great amount of dissatisfaction with this excellent process. It has now been traced to the state of the water, as regards hardness or softness, with which the plate is subsequently treated, and the knowledge of this will, doubtless, prevent the recurrence of this evil. The new developer, however, seems to be quite inimical to this kind of defect—a point specially noticed by Mr. J. Dudley Radcliffe, a record of whose experiments is as follows:—

"I send you two transparencies developed with the new iron developer. They are both gelatino-bromide plates of my own preparing. No. 1 had three seconds' exposure to a No. 2 fishtail gas flame. It was then soaked in plain water for one minute and the developer poured on. The picture came up faintly in twenty-five seconds, and in fifty-five seconds the development was complete. The plate was now washed, fixed, and again washed. It needed intensifying with acid silver. No. 2 was exposed under the same conditions for two seconds. The developer was kept on for three minutes. This plate was not intensified. I think I ought to mention that these plates would require about the same exposure and would take about as long a time to develope with an alkaline developer. There is a liability for this developer to show drying marks, which there is not with the alkaline method; but, no doubt, further experience in its use may show how to do away with this very serious defect.

"I wish to draw your particular attention to one fact, and that is that those plates did not show the slightest tendency to blister, either during development or during the process of intensification with acid silver. This was the more remarkable inasmuch as they were from a batch which invariably blister under the ordinary alkaline developer.

"The developer was prepared as follows:—A saturated solution of iron oxalate was made in a saturated solution of potash oxalate (neutral) and filtered. No restrainer was necessary. If I found occasion for one I should try gelatine."

As respects the drying marks to which Mr. Radcliffe alludes as being present in two of the negatives he has left with us, it is a matter to which we attach no importance, as it is owing to the developer not being quite washed out of the film. It must be borne in mind that the iron developer is *very* much stronger in regard to the amount of crystallisable matter contained in it than the alkaline pyro. developer, and hence a much more thorough washing is required in order to effect its removal.

The quality of the gelatine negatives produced by the ferrous oxalate developer is so excellent that we think it probable it will, to a large extent, supersede pyrogallic acid for this purpose. We may observe that we are trying some experiments with the developer as applied to *undesiccated gelatine* films and *moist* collodio-bromide plates, and as the result of these we hope in a short time to be able to announce that the greatest degree of sensitiveness hitherto attained will be by this process. The light at present is so bad that we prefer not to speak positively on this subject, but to wait until by a greater number of experiments we shall be able to indicate in more precise terms the value and applications of the ferrous oxalate developer.

We hope to secure the co-operation of some of those able experimentalists whom we are proud to number among our readers, so as to be in a position to have something definite to place at the disposal of practical photographers before the advent of the outdoor season.

WARMING THE STUDIO.

Bearing in mind the old saying that "as the day begins to lengthen so the cold begins to strengthen," warming the studio and *atelier* of the photographer will be considered a most seasonable subject. Various methods of arriving at this much-desired consummation have from time to time been given in the pages of this Journal, and it is now our good fortune to be able to give a brief description of another, which has elicited high encomiums from those who, having tried it, are enabled to speak from personal experience. We allude to the system of heating by means of hot water invented and patented by Mr. James Keith, of Arbroath.

Mr. Keith's invention comprehends a method by which the water to be employed in warming a house is heated with the greatest possible rapidity, and at an expenditure of but little fuel.

The apparatus consists of a new or improved arrangement of boiler and inside heater, with down centre flue, boiler casing, furnace and grate attachments, which the inventor proposes to call "the rapid circulator and fuel economiser."

The boiler, which may be of any desired form, is constructed of either malleable or welded iron or steel, cast iron, or any other metal capable of withstanding the heat. The body and top of the boiler are composed of two shells, between which the water circulates, and connected to the inside shell is a heater or other shell having a flue or pipe carried down through its centre and out at the side of the boiler, by which the flame and smoke pass directly through the centre of the heater. The flames having to turn round and down when at the top of the above flue give an intense heating power, and the draught is very strong and equal, being all drawn to the centre of the heater before descending.

The above heater is properly connected to the inside shell or body of the boiler both at its lower and its upper part, thus causing a constant and rapid circulation in the boiler itself whenever the least heat is applied to it; all parts of the boiler expand, being surrounded or covered with water. The heater has a flat or raised bottom, which is carried down to within a short distance of the top, and covers nearly the whole surface of the fire, thus "frying" over the fire, as it were, and allowing the heat and flames to escape up between the outside edge of it and the sides of the inside shell of the boiler, and after which, passing up between the said heater and the said inside shell, on arriving at the top they turn down through the centre of the heater again (as already described) and pass through the side of the boiler, entering into the space between the outside casing and the outside shell of the boiler, and, after passing once, twice, or more times round the outside and over the top of the boiler, they enter into the funnel or chimney attached to the top plate of the casing. Suitable dampers and soot and cleaning doors are provided at proper places in the funnel, boiler, and casing.

The furnace is, therefore, inside the boiler, in the side of which is the furnace door, the fire being surrounded on all sides by a thin lining of water constantly circulating. The boiler extends to within a few inches of the furnace bar plate, and the space between the bottom of the boiler and top of the bar plate is filled in with a thin lining of fire-bricks moulded to suit to keep life in the fire when it is damped down.

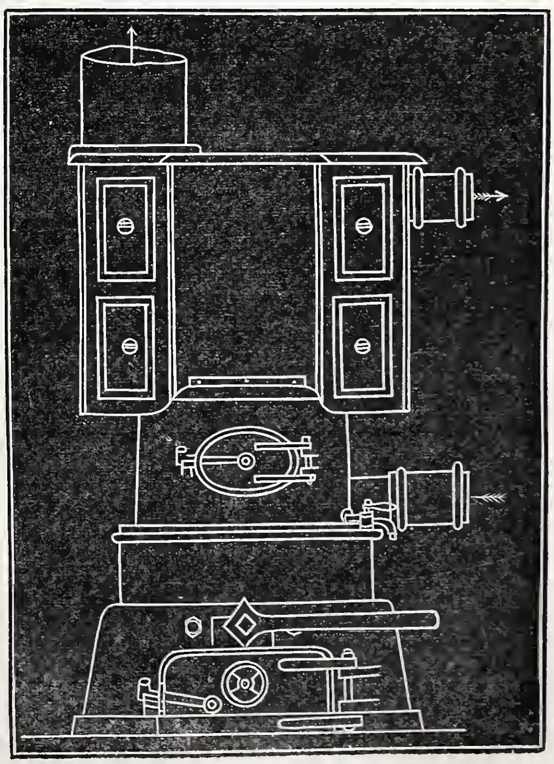
The whole apparatus stands on a metal frame provided with hinged damping grate and ashpan and damper door arrangements complete. No building work whatever is, therefore, required about the boiler, and standing by itself it takes up very little room and is very easily heated up, having no surrounding brickwork to absorb the heat.

The flow or heat-circulating pipe or pipes are led from the very top of the boiler, and the return or cold pipes from the lowest part, and are connected to the boiler by suitable collars or sockets, cast, welded, or bolted on to the outside shell.

All the shells and heater can either be welded together in one piece or rivetted or bolted and jointed properly together, or otherwise connected in separate parts.

The said boiler, either for steam or hot water raising and circulating purposes, owing to its peculiar construction, has more direct and indirect superficial heating surface than other boilers of the same size in use, while its great heating powers, coupled with the minimum consumption of fuel, renders it greatly superior to boilers at present in use for the purposes specified. Instead of the central flue through the heater this flue may be dispensed with, and a central heater hung down from the top or dome of the boiler to give similar effects.

The accompanying diagram affords a view of the exterior of the apparatus, the interior view of which, although also shown in the



specification, we need not here give, contenting ourselves by stating that it is constructed in harmony with the description we have already given. The upper portion is the boiler, through which the heat from the furnace, situated below, travels upwards and downwards, until robbed, or nearly so, of its caloric, the products of combustion escaping through the aperture at the top. The water enters the boiler through the lower of the projecting pipes or apertures on the right-hand side of the apparatus, and is emitted through the upper, suitable pipes being of course connected with these apertures to permit of the water being carried throughout a building.

We have said enough to convey a good general idea of the nature of Mr. Keith's invention; but as regards the manner in which it is practically found to work we are unable to speak from our own observation or experience, and, instead, prefer to give the opinion of Mr. J. Valentine, photographer to the Queen, Dundee, who, we are aware, has had his large new establishment in Perth-road heated by Mr. Keith's system. A portion of these premises consist of two floors, each 80 × 16 feet. To properly heat these rooms during cold weather was found to be no easy matter, and Mr. Valentine has described some of the methods adopted by him to effect the desired end, including an open fire and four of the best stoves he could procure. All these proved inefficient, and he was about to revert to an older and less expensive system previously adopted by him, when he was impressed by an expression contained in a letter on the subject received from a photographic friend, Mr. Marshall Wane, of the Isle of Man, in which that gentleman said he had found Keith's system to be "simply perfection;" so after due inquiry Mr. Valentine adopted it, and reports the results as follows:—

"I have at last got heat to my statisfaction. Not a hitch in its operations since its introduction has taken place. Little attention is required, it being only fed once a day, and at a cost of less than two shillings per week. I use gas coke, although the cheapest coal dross may, with equal advantage, be used. I am now, in the coldest weather, in a comfortable atmosphere, every part of my large premises being uniform in temperature, besides having an abundant supply of hot water for washing. In an hour after the fire is lighted a mild and healthy temperature pervades the whole place. I have said "a mild heat," but a great heat can be secured; only open the damper, give more draft, and shortly afterwards you will feel as if in an oven. The freedom from dust is not a less important consideration; for, except a small quantity of dust which falls into the ash pan, there are no ashes—all are consumed with the smoke, and the ashes that may fall through the grate bars have only to be taken from the ash-pan and placed in the fire with fresh fuel, when they will be burned over again into dust.

"Over the pipes and at the boiler I dry my albumenised silver paper, and from a galvanised hot-water tank, most ingeniously fitted to the higher part of the apparatus, I can draw in my washing troughs an unlimited supply of hot water—so valuable in a printing establishment. This hot-water tank is also so directly arranged and connected to the boiler by separate pipes and stop valves that I can still get the hot water for washing in the summer time without having to heat up any other part of my premises, all the rest of the pipes for heating being shut off in summer.

"As the apparatus requires only to be supplied with fuel once or twice a day, according to cirumstances, it can go on night and day, thus ensuring at all times an equal temperature. At night the fire is simply filled with ashes and fresh fuel, and every inlet and outlet to the fire being closed by suitable appliances attached to the apparatus, the whole is perfectly safe and free from risk of fire. The fire of the boiler, being all water 'jacketed,' or surrounded on the outside wholly by water, the premium for fire insurance is thus reduced to a minimum.

"The piping I have is about three inches in diameter, and of cast iron; but I believe Mr. Keith uses various sizes of pipes to suit the different circumstances under which his system is introduced. He seems to fit up these pipes so as to produce perfect success."

The foregoing account of the performance of this boiler will be read with interest. The saving effected is said to be considerable, while it must be a great comfort to be able to get such an apparatus fitted up without experiencing the necessity for having recourse to the offensive and "messy" services of the bricklayer.

In a private letter Mr. Herbert B. Berkeley suggests the possibility of free silver in a fogging emulsion "combining with, or being taken up by, the silver bromide in such a way that it could not be washed out again." We are not in a position to speak as to the probability of such a change occurring *in emulsion;* but some such combination, whether chemical or only mechanical we cannot say, does appear to take place when silver nitrate and silver bromide react upon one another under certain conditions. If silver nitrate be fused in a porcelain capsule, and freshly-precipitated and dried bromide be added to it, the latter changes colour and dissolves, forming a glassy, transparent mass of a brownish-grey colour. When allowed to cool it assumes the opaque appearance and colour of the bromide. If the temperature be not too high there will be little, if any, evolution of acid fumes; but if the heat employed be much greater than is necessary for the fusion of the nitrate a considerable quantity of nitrous acid fumes are given off, the product in either case being similar in appearance. Now the peculiarity of this product is that, if it be reduced to fine powder and digested in water, it gives but a slight trace of soluble silver salt; but the water may be repeatedly changed without removing the free silver. Treated with hyposulphite of soda it dissolves, leaving a brown-black sediment—apparently hyposulphite of silver. The appearances are such as to justify the belief that, as Mr. Berkeley suggests, the nitrate is taken up by the bromide, without, however, entering into chemical combination. How far such an action is possible under the altered conditions which exist in an emulsion we are unable to say. The writer goes on to suggest that the free silver thus retained by the bromide would be reduced by plain or alkaline pyro. (producing fog), but not by acid pyro. We may remark with regard to this that we have sometimes found an unwashed emulsion which fogged badly with pyro. and alkali give a perfectly clean though feeble image with pyro. and silver; but in the majority of cases the fog appears irrespective of the mode of development. We have never attempted to trace the cause of this difference, but should ascribe it to the presence of perhaps a more than ordinarily strong dose of acid. With a washed emulsion in the fogging state we do not recollect having tried silver development; but it will be interesting to try such an emulsion both before and after the addition of acid, and to note the difference in behaviour.

APPEARANCES *VERSUS* REALITIES.

In one of the very interesting communications upon stereoscopic transparencies which have recently appeared in these columns mention is made about printing-in a moon, with clouds, &c. This so forcibly recals to me some of the vagaries indulged in by painters as well as photographers when the pale orb is in question, that I here make a few notes upon it and cognate subjects.

Photography is always held up as a model of truthfulness, and, in a restricted sense, justly so; but it is only in a restricted degree that I can endorse this character, granting, even, the use of non-distorting lenses and properly-adjusted and managed cameras; and it is this very character of truthfulness that makes photographic deception, whether intentional or not, to be so full and complete. Thus, Mr. Breese's moonlight effects were so wonderfully contrived as to deceive not only the general public, as they did so utterly, but photographic experts also. The pictures appeared to be taken by the light of the moon, but were not so taken.

How often, again, do we hear complaints, and see examples giving just grounds for them, of perspective so exaggerated as to give misleading representations of the proper sizes of objects; while, at the same time, the pictures are quite correct, their fault being an injudicious selection of standpoint and the introduction of objects lying too close to the spectator! That they are correct is easily proved by placing a sheet of transparent glass between oneself and the view, and, keeping the head stationary, marking out leading points and lines of various objects seen beyond; they would coincide to a hair's breadth with the same picture taken in a photographic camera from the same spot. The picture may be made in this manner the exact size of the photographic one by moving the glass to and fro till it is in such a place that any given object drawn upon it so that the drawing covers the object looks as large as it does in the photograph; the rest will then all follow.

This drawing of a picture upon a sheet of glass is the theory upon which the system of perspective, mathematically and exactly treated, is built. Any object of known dimensions, and at a known distance from the glass, can be depicted by the aid of the rules of perspective so as to coincide exactly with the photographic representation; and the different distances of the theoretical plate of glass—"the picture plane"—may be considered as analogous to the various foci of lenses that can be used to photograph with. Hence it follows that, mathematically and truly, a comparatively short-focus lens depicting a very wide angle of view shows us exactly what we do see. Yet we are not aware of it; our senses are deceived by the relative magnitude of objects, and our brain refuses to accept the image presented to it, because it has brought for its mental digestion such an association of ideas as it is not accustomed to.

The same thing exists in everyday life in a remarkable manner. No sooner is an object brought before us for a rigid scrutiny, which ordinarily we see only in a slight and temporary manner, than we perceive such a variety of peculiarities that we never dreamed of before; and if the object be brought before us, not only for close scrutiny, but in an unusual position or in an uncommon conjunction of circumstances, then many of its attributes before unknown were instantly perceived. Take the most usual instance—a face to be photographed. Few faces in existence are quite symmetrical; but, except in gross instances, neither to their owners or their owners' friends is the fact perceptible; and, when the picture comes home, how frequenty is an outcry raised against it on account of that "nose so crooked and those eyes so odd," often taken back at once to the photographer with the complaint repeated to him, and at other times compared with the original, and want of symmetry actually existing for the first time perceived!

Another example I present to my readers:—

S S S S S S S
8 8 8 8 8 8 8

Here are a row of letter S's and of figure eights, taken at random. At a casual inspection the reader might say the letters were symmetrically made—that is, the top and bottom lobes of the figures and letters the same size—though upon a close inspection he would either say that it was doubtful whether any difference existed or he would notice the true relation that exists, the top lobe being the smaller. Let him, however, turn this page upside down and the most cursory glance possible will show him their shapes, and the dissimilarity between the upper and lower halves will strike him with astonishment if he have never tried the experiment before.

Thus, also, with regard to natural objects and their appearances. Everything depends upon their being viewed from an ordinary standpoint. If any position at all unusual be chosen for viewing them from, their appearance undergoes a change from what the mind is accustomed to, and if so depicted an effect of untruth would be presented. Figures are introduced into pictures to give effect—often with ludicrous unreality as to the true size relative to objects about them; and so when they are printed in photographs from a separate negative due regard should be had to appearances as opposed to realities. Thus, if it be desired to place a group of figures at a distance (say) of a hundred yards from the spectator, they would be printed in of appreciable size as to the mind their appearance would require to be done. To test the effect, however, let an observer ascend a high steeple of a church—as high as the distance I have just named. The people below him present such a pigmy aspect that if he were to depict them he would place tiny dots in place of the comparatively large figures in the group I instanced—a difference far greater than would be warranted by the effect of looking at the figures endways, so much do unwonted conditions react upon the judgment.

I may conclude my notes by a further reference to the object that suggested them—the moon. The secret of the moonlight effects of Mr. Breese, in one respect, was found out, and numbers of pictures were produced in imitation—a very conspicuous white moon being frequently added, suggestive of a wafer having been stuck on to the negative, and much sarcastic criticism was spent upon them. The question arose—How large was the moon to be to have a natural effect? To answer this exactly is no easy task. Every one is familiar with the harvest moon, looming large above the horizon—as large, apparently, as two or three ordinary moons rolled into one. I have no doubt that I shall surprise many of my readers when I tell them that this large size of the moon is a purely *mental* effect caused by the real image on the retina being brought close to objects of familiar and known dimensions, *e.g.*, trees, houses, &c. Really the harvest moon occupies the same area of space upon the retina as it does when high up in the heavens. Any doubt on the matter will be at once set at rest by viewing the harvest moon, telescope fashion, through a piece of paper rolled up and held in the hand. At once it appears diminished in size, while when high up in the heavens no diminution in apparent size would be seen through the rolled-up paper.

Still I have not answered the question, and I do not intend to give an entirely definite answer; but, instead, will supply a final means of comparison. Naturally the moon should be represented as large as it appears to be, and how large it does appear to be may be judged by holding up some object in the hand and placing it, as it were, side by side with the moon. I have often asked my friends' opinions, and have received replies unanimous in their great incorrectness, a dinner plate or a crown piece being generally the two extremes of maxima and minima. The truth is that the object which, held up in the hand and compared witht he moon, would appear the same size is neither of these—it is far smaller (a dinner plate would be as large as seven or eight thousand moons); it is a small pea. If a pea be stuck on a pin and held at arm's length it would entirely hide the moon from view!

I think I have shown how deceptive are appearances, and the moral I would draw is:—Before introducing a moon or a figure or any object into a picture think well over all the bearings between appearances and realities, and to aid in doing so I believe the notes I have written will be of some service.

G. Watmough Webster, F.C.S.

A FURTHER IMPROVEMENT IN THE GELATINE PROCESS.

[A communication to the Liverpool Amateur Photographic Association.]

The subject which I propose to bring before you this evening is one, I think, of considerable importance to photographers in the field. The advantage of superseding glass as a vehicle for the sensitive film in favour of something more portable and less frangible cannot be gainsaid. I have already worked out a process whereby the ordinary sheets of gelatine to be purchased in the shops may be made available for this purpose; but, in spite of all the simplification I have been able to effect in the *modus operandi*, the end in view cannot be obtained with the perfection to be desired.

In the first place, the gelatine sheets of commerce are usually full of bubbles and specks; and, in the next place, to obtain complete contact between the gelatine and the surface of its temporary support is a process which, in spite of my own testimony in its favour, I must confess to be, at times, no easy matter. During my recent vacation I set myself to work to discover the ingredient employed by the gelatine makers to enable them to separate the dried sheets from the glass slabs upon which they have been poured. This ingredient had made its presence manifest to me in my previous experiments both by its colour, its taste, and its smell; and I felt that if I could discover its character further it might then be in the power of gelatine workers to make their own sheets for photographic purposes, or even to incorporate this ingredient with a gelatine emulsion, and thus obtain a film which, when dry, might be stripped from its support and form a self-supporting sensitive sheet. My appeals to gelatine makers were of no avail, for I was seeking to unravel one of the mysteries of the Eleusis of trade; books were entirely silent on the subject, and I was, therefore, left to my own resources in the matter.

I will not inflict upon you the wearisome details of my experiments in this direction; suffice it to say that an accidental carelessness in dealing with an emulsion prepared with gelatine containing the substance of my quest gave me the clue, and I found in ox-gall the material I was in search of. I cannot claim to place before you a perfected process; for my leisure time has come to its close while yet the application of the discovery remains in an inchoate condition. Sufficient success, however, has been attained to warrant me in trespassing upon your patience tonight in the hope that other workers may be able to carry the matter to completion.

Ox-gall may be obtained in three forms:—There is, first, the ox-gall proper; then a purified, pasty preparation of it used in medicine, and sold by chemists; and, lastly, a clear, colourless liquid supplied in the shops for the use of artists. I have found that all three kinds—either when employed in the gelatine itself or when used upon glass as a substratum—will effect the desired end, provided that plain gelatine be used; but I have hitherto failed in every effort to employ it thus with an emulsion. The sheets I have here were stripped from glass which had been immersed in ox-gall from the butcher's, and then dried. They proved to be readily removable; but until a harmless and complete deodoriser has been found I cannot recommend the experiment to any one who is not possessed of a strong stomach and very unsusceptible olfactory nerves.

Here are some plates with a dried, plain film of gelatine still adhering to them. In this case the ox-gall is present in the film, and I think I can show you succesfully how readily the sheets leave their support when the point of a knife has been passed round their edges.

My next specimens consist of sheets similar to those I have just stripped from the glass, with the addition of a sensitive coating of emulsion. These also I will remove from the plate and pass round for inspection. I have exposed and developed one of them this morning, which I must show you still in its wet state. The negative is a good one; but, being the first I have exposed prepared by this new process, it has suffered to some extent from the frequent handling and examination it has undergone.

These films were prepared as follows:—Plain gelatine, containing a proportion of ox-gall, was poured upon clean glass, and then, when dry, was sensitised with a film of ordinary emulsion. The advantage of this plan over that to which I have alluded above, and which I have given in detail in The British Journal Photographic Almanac, is considerable. The emulsion will be found to flow easily over the gelatine, and when desiccation is complete the sensitised sheet will easily come away from the glass.

I have not found the second kind of preparation of gall which I have mentioned nearly as effective as the noisome article which the butchers supply; and the prepared alcoholic solution of the artists' colourman is too expensive to be employed largely in the process. But I think that if gelatine workers would only create a demand the manufacturers will supply us with gelatine prepared with ox-gall for this special purpose. It will then be merely necessary to dissolve the required quantity in water, to coat the glass plates with it, and finally to sensitise with the emulsion in the usual way.

The one drawback to the preparation of these films lies in the slowness of the drying process. Some one has recommended dipping the gelatine in alcohol. I tried this recently, but found the alcoholised sheets were quite as slow as the others.

To those who would wish to experimentalise for themselves the following directions will be useful:—Take of fresh ox-gall one ounce; add it to eight ounces of water, soak in this one ounce of common gelatine, apply gentle heat, and filter. Coat the warm plate in the usual way with a thin film, and place it upon a level glass slab. Now pour from the lip of the cup upon the levelled plate about a drachm more of the liquid gelatine, and leave till set, when it may be stored away in the drying cupboard till it is thoroughly dry.

The same process must be repeated with the emulsion, *i.e.*, a supply should be flowed like collodion over the whole surface of a warmed gelatinised plate; the glass must then be placed upon the level slab, and a small quantity of emulsion added. The tip of a glass rod or a clean finger should now be applied to direct the emulsion to each corner and up to the edges of the plate, and it may then be allowed to set and dry in the usual way. The film will come away from the glass by inserting the point of a knife round the edges, and it may be exposed in the camera in front of a thin piece of glass to keep it taut in its place; or, better still, the sheets may be arranged after the fashion of a sketching-block, with a piece of non-actinic paper separating each sheet from the rest, and the whole backed up with a plate of tin or zinc. To develope the sheet: wet it thoroughly, place it in a shallow dish, and apply the usual alkaline developer. Should the negative assume a reddish tinge when fixed, washed, and dried, printing should be accomplished through a piece of blue violet gelatine. I must not omit to mention that the negative should, when the washing is completed, be placed upon a glass plate and left to dry spontaneously.

Throughout the process care must be taken not to raise the temperature of the room or closet in which the drying is effected above 60°, otherwise inevitable cockling and splitting of the film will result. The former evil may, however, be remedied by leaving the cockled sheets in a damp place for a time. They will then become perfectly supple without tackiness of surface, and may be flattened by placing them under a moderate weight.

In conclusion: I may remark that Mr. J. Green, of Dalston, London, is the maker from whom I purchased the sheets I have hitherto employed, and I am not without hope that he and other manufacturers may be induced to prepare for workers in this process a transfer gelatine which could be used as I have suggested above. Possibly also Mr. Kennett or Mr. Mawdsley may be persuaded to try their hands at the production of these portable sensitive gelatines, and supply them to the photographic world for the use of tourists on their travels. H. J. Palmer, M.A.

THE VALUE OF PATENT KNOTTING IN THE STUDIO.

The importance in the studio of the above-named substance can scarcely be over-estimated. It is a glue perfectly insoluble in water, and is equally as strong as cabinet-makers' glue. This is easily proved by joining together by its means two pieces of wood and then breaking the united piece near the joint; for if the joint itself be good it will not break, but the disintegration will take place on one side or the other of it.

When making joints in wood the knotting should be allowed a few hours to dry; but when joining paper or cloth a few minutes will suffice. It is far superior to negative varnish for protecting the dark slide from the action of nitrate of silver, being a stronger body, although similar in manufacture.

Patent knotting is the very thing for making dishes of Bristol boards, &c., so often spoken of; also for protecting iron work from rust. In many cases it will be found to be really "a friend in need."

It should be kept in a bottle, the neck of which should be just the size to fit the binding of a painter's sash tool (brush), and which would answer for a stopper or cork, at the same time keeping the brush always moist and ready for use, although it does not touch the liquid.

The cost of the knotting is about ten shillings per gallon, and I suppose would be about 1s. 6d. per pint. I can assure the readers of the Journal that it only requires a trial to prove its value.

James Harris.

EXPERIMENTS WITH YELLOW CHRYSOÏDINE VARNISH.

[A communication to the Berlin Photographic Society.]

Lately chrysoïdine has been recommended as an ingredient in the preparation of yellow varnish for the covering of negatives and for the yellow windows of the dark room, in the place of dragons' blood, which appears less able to withstand the action of light than the chrysoïdine.

Chrysoïdine is a yellow dye which dissolves easily in alcohol. Forty cubic centimetres of varnish, to which 0·6 of a gramme of chrysoïdine had been added, produced a deep brown colour, and when spread upon glass gave a strong yellowish-red film, darker in colour than ordinary yellow glass. Glass so coated promised, when used for window panes for the dark room, to be useful, as the chrysoïdine solution, examined by the spectroscope, shut out the green and blue rays much more completely than French oiled silk, which is used in the dark room of the photographic *atelier* of the Gewerbeakademie, and gives better results than yellow glass.

Experiment, however, showed that so considerable a quantity of actinic light as still passed through a plate of glass coated on both sides with chrysoïdine varnish, that such a yellow varnished glass being fixed in front of a lens a landscape made a distinct impression through it on the sensitive plate with an exposure of two and a-half minutes. It is also a fact that in clear weather a little actinic light always makes its way through a yellow oiled-silk window, so that fogging can only be avoided by preparing the plate in some of the half-dark corners of the room. Herr Zipser tried a 10×8 sheet of glass varnished on both sides with chrysoïdine as a dark-room window, and, working at a distance of one metre from the window his plates fogged, but at two metres' distance a plate could be prepared without any bad results. In order to test the comparative protective powers of chrysoïdine varnish and oiled silk against actinic light a stereoscopic camera was taken, and, the objectives being unscrewed, the opening left by one lens was covered with French oiled silk and the other with a sheet of glass coated on both sides with chrysoïdine varnish, the camera then placed in front of a window and a wet plate exposed in it. It was then found that when placed opposite a grey sky the double film of chrysoïdine produced fog with an exposure of a minute and a-half, while the much paler-coloured double oiled silk afforded complete protection against the light.

It follows, therefore, that, though chrysoïdine varnish appears darker, and in the spectroscope absorbs green light more powerfully than oiled silk, still the varnish allows a greater quantity of blue—that is, actinic—light to pass through it than the silk. On account of the insensibility of the eye for blue in the spectroscope one does not detect it at all with the eye, though it is easily detected with the aid of the photographic plate. If Herr Bardy used chrysoïdine varnish successfully for a dark-room window, it must have been because he did not coat glass with the varnish but impregnated paper with it, which, less transparent than glass, kept back fifty per cent. of the light.

It is known that a solution of red bichromate of potassium is a powerful absorbent of blue light, and with this substance I have also made several experiments:—A film of one to twelve bichromate of potassium solution was enclosed in a glass vessel with flat parallel sides, one centimetre apart. This film was much paler and yellower in appearance than the double film of chrysoïdine varnish, but it afforded a much better protection than the latter. A plate exposed, fronting the sky, for two and a-half minutes behind the bichromate solution showed not a trace of fogging.

From these facts it is evident that it is by no means the substances which produce the darkest yellowish-red that keep out actinic light best; but, on the contrary, that many paler yellow films give a better protection than the reddish-coloured ones. As a yellow varnish for covering negatives, chrysoïdine varnish is excellently adapted.

H. Vogel, Ph.D.

THE LIQUEFACTION OF GASES.

M. Dumas has thought that the marvellous experiment of the liquefaction of hydrogen by M. Pictet, of Geneva, facilitated in an exact manner the determination of the density of oxygen. It suffices, in fact, to weigh the quantity of liquid obtained by M. Pictet in order to see what is the volume of this same quantity. Now M. Pictet, having obtained the considerable quantity, relatively, of forty-five grammes of liquid oxygen, and this liquid occupying in the tube a space of forty-five cubic centimetres, it is seen at once that the density of the liquefied oxygen is, like that of water, equal to unity. Theory had already established this quantity, but it is now confirmed by experience.

M. Dumas has also given a *résumé* of a second communication from M. Pictet, showing, without the possibility of doubt, that not only has oxygen been liquefied in his apparatus, but also solidified, which is the complete realisation of the prophecy of Lavoisier, the renowned creator of modern chemistry. In fact, the jet of liquefied oxygen issuing from the tube, illuminated by the electric light, has been examined with the polariscope, and it has given indisputable signs of polarisation. Now it is known that for this phenomenon to be produced it is necessary that the light should be reflected from solid isolated particles. In the liquid itself there are in suspension small crystals of oxygen "snow," as crystals of watery "snow" are seen in the middle of those white clouds known to meteorologists under the name of "cirrus."

Doubt is no longer possible that liquid or solid oxygen is really obtainable, it is, therefore, clearly evident that chemists may succeed quite easily in solidifying the atmospheric air now that it has been liquefied; and thus will be realised the curious result of the transformation of a volume of air into a solid block.

The solidified hydrogen was preserved in this state for several minutes by M. Pictet, and produced in falling on the ground the sound of metallic grains. The liquid jet or stream had a steel blue colour.

W. Harrison.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

What an extraordinary "trial of lanterns" that must have been which took place last month at the meeting of the Bristol and West of England Amateur Photographic Association! To be informed that some of them were exhibited with lenses at open aperture, and others having lenses with apertures very much contracted, is to apprise everyone of the fact that the trial was made under circumstances which would prohibit the results from being placed in comparison. But what is meant by a "trial of *lanterns?*" Is it not, in reality, intended to mean a trial of the illuminating power of the *lamps* in the respective lanterns? Lanterns now differ little, if at all, in their optical parts; and what is, or ought to be, tested is the value of the respective methods of illumination employed, this constituting the chief difference between the lanterns of the various makers. It is true that the external covering, or case, differs in form and construction, according to the maker; but in the Bristol "trials" this feature was, very properly, not attended to, the intensity of the illumination being *the* feature. To test lanterns or, more properly, *lamps* each lantern must be fitted with condensers and objectives of a precisely similar form, and two or three discs from a like number of lanterns thus fitted projected side by side on a screen. A partisan of each form of lantern (there is partisanship even in philosophical apparatus) should be present to see that his special pet is shown at its best, and either the discs or the bare flames should be examined through a piece of deeply-coloured glass. For "rough and ready" photometric purposes I employ several coloured glasses, increasing the number until, when I examine the lights through them, the weaker ones have entirely disappeared. Glasses of the kind used as sunshades for telescope eyepieces, or for sextants, answer this purpose well. I conclude this paragraph by expressing a desire to see a lantern-lamp tournament held, so that we may know which of the various modes of lighting, short of the lime light, gives the most intense illumination. The *lamp* once settled, the question of the optical arrangements would not occupy much time in being determined in an equally satisfactory manner.

* Concluded from page 51.

It has afforded no small amount of amusement to myself and others to see how very conservative the Edinburgh photographers (Dr. Nicol among others) are with regard to the *modus operandi* of Mr. Gray (of that city), who has got hold of, or worked out, a gelatino-bromide process whose merits they proclaim with a flourish of trumpets, but as to divulging its nature they are prudently reticent. We are now informed that they—certain photographers in the north—have "abundant evidence that by it dry plates may be made much more sensitive than the ordinary wet collodion film." Query: has the same thing not been said repeatedly during the past four years of the gelatino-bromide processes of other workers who have displayed less reticence as to their method of preparing this substance? One would, from reading the *dicta* of certain of these writers, almost imagine that the sharp men of the northern capital were not keeping themselves well posted in what has for some years been doing in the world of gelatino-bromide. I here duck my head to avoid the storm which the enunciation of this mild sentiment may evoke; for, however *prudently* they may behave in divulging formulæ tending to advance photography, "nobody can deny" the readiness of our northern brethren to enter the field of strife on a mere whisper that there is a coat tail trailing within range of their visual organs.

The Cleopatra ship containing the famous "needle" is now moored within a hundred feet or so of the Albert embankment of the Thames, opposite St. Thomas's Hospital. The most stupid and careless photographer in the world could not fail to secure an excellent photograph of this famous and quaint little vessel as she lies at anchor, her side always directed to the observer from the embankment.

ON THE CAUSE OF THE SENSITIVENESS OF WARNERKE'S EMULSION.

[A communication to the Berlin Photographic Society.]

With Dr. Vogel's permission I made a number of comparative experiments upon the sensibility of ordinary bromide of silver plates prepared in the bath and Warnerke's emulsion plates. The latter were prepared with an emulsion left behind him by Mr. Warnerke, and the former by sensitising in a bromised collodion (two grammes of bromide of cadmium, thirty grammes of alcohol filtered, and added to three volumes of two per cent. raw collodion), washing and drying. Both sorts of plates were exposed simultaneously, and for an equal length of time, in cloudy weather, in front of a plaster bust standing upon a black stand. The duration of the exposure was not longer than I should have given a wet plate under the same circumstances. Both plates were then treated with Mr. Warnerke's strong developer. The result was that the ordinary bromide of silver bath-prepared plates were scarcely so sensitive as the emulsion plates, but in the black parts of the original they gave more details than the latter. The experiment was several times repeated with the same result. The great sensitiveness of Warnerk'es plates seems, therefore, to depend upon the action of the strong developer.

—— Zipser,

Photographic Atelier of the Royal Industrial Academy, Berlin.

SUGGESTIONS RESPECTING THE SUB-BROMIDE THEORY.

I submit to your consideration the following details of an experiment I should like experimentalists to make, for I think it would throw great light on the worth or correctness of the sub-bromide theory. I would have undertaken it myself were I not compelled to be, for a long period, away from my laboratory.

An emulsion to be formed so compounded as to leave a definite quantity of silver nitrate in excess of that necessary for the transformation of the whole soluble bromide into silver sub-bromide. At first silver bromide is formed, silver nitrate being greatly in excess. If it be correct to say that the silver of the silver nitrate combines with the silver bromide to form silver sub-bromide, the excess of silver nitrate ought to become smaller and smaller in the course of time. Now this may be ascertained by testing the emulsion for free silver, at certain intervals, getting smaller by the transformation of the silver bromide as soon as all the bromide is converted into sub-bromide. This excess will at last prove to be of an uniform value, so, then, as soon as successive tests show or give a constant result the operation is ended. Substracting the final quantity of silver nitrate from the original, we have the quantity which has combined with the soluble bromide, and we may feel satisfied if this theory be fulfilled.

The organic matter of the collodion introduces a slight error in the result. This difficulty may be overcome in different ways:—1. By ascertaining beforehand the quantity of silver nitrate combining with the organic matter in the normal collodion. 2. By making two similar experiments with two collodions containing different quantities of soluble bromide per ounce, sensitised so as to have the same excess of silver in both. Using the same normal collodion, we may say that the same or a similar quantity of organic compounds, combining with the same proportion of silver nitrate, is contained in the two emulsions; so it may be shown that, the quantity of silver combining with the organic matter and the actual excess being the same in the two emulsions, the difference in the quantity of silver nitrate added to the more heavily-salted sample represents the quantity which enters into combination with the bromide. Thus we have the quantity of silver nitrate combining with the difference of the quantities of soluble bromide introduced in the normal collodion. L. O. Sammann.

FOREIGN NOTES AND NEWS.

Two New Journals.—A Wrinkle for Long Exposures.—Applications for Patents.—Dr. J. M. Eder and Capt. Tóth on Chrysoïdine.

The firm of A. Braun and Co., Dornach, have just issued the first number of a new monthly photographic journal, which is to appear simultaneously in French and in German. The French version, which is called *La Lumiére*, has a tricolour title page. The German version raises the number of German journals to eight. The illustration to the specimen number is a photograph of the *Venus de Milo* (in the Louvre).

In the *Photographische Zeitung* Herr von Brauck recommends the following for long exposures:—Dissolve in a bottle and shake—

Distilled water	35	parts.
Alcohol	3	,,
Crystallised citric acid	1	part.
Glycerine	6	parts.
Nitrate of silver	2¼	,,

Pour the filtered solution over the freshly-silvered plate just as it comes out of the bath. Move the plate about, as when coating with collodion, until the greasy marks disappear. Do not use too strong a developer. With plates so prepared one may expose a long time without getting dry spots.

The *Mittheilungen* mentions, amongst other applications for German patents, that of Dr. Liesegang for a peculiar form of camera, and that of Herr Strumper, of Hamburg, for a process for burning-in lichtdruck pictures upon glass and porcelain, &c. Herr Schüler, of Berlin, has obtained a patent for a method of producing a photographic film upon glass, capable of being ground by the sand-blast.

In the *Photographische Correspondenz* Dr. Eder and Capt. Tóth report as follows upon chrysoïdine as a protection against the action of actinic rays:—"As you are aware, chrysoïdine was recommended a short time ago by Rossignol, of Paris, as a colour which transmits no actinic light. The dye, which is difficult of solution in water, but very soluble in ether and alcohol, may be added to a negative varnish with which the dark room window may be coated, or sheets of gelatine may be coloured with it and then placed in front of the window. We found the dye very efficacious, in so far that a sheet of gelatine prepared with it, according to directions given in the *Archiv*, proved a somewhat better protection against the chemical action of light than a pretty dark yellow glass. Red glass of medium density gave a better protection than the chrysoïdine gelatine leaves, and so did a green and a yellow sheet of glass laid one over the other. The experiments as to the transmission of light were made with emulsion plates. Generally it might be said that yellow glass was less of a protection against light than a chrysoïdine film, and that red glass is preferable to either. On account of the agreeable colour, we use in our dark room double sheets of glass—yellow and green—and they are, at least, as effectual a protection as chrysoïdine. Of course the efficacy of the chrysoïdine film varies with the depth of its colour. Still, chrysoïdine is a convenient means, without much trouble, of getting a serviceable dark room; and in emulsion work the coating of the yellow glass with chrysoïdine varnish is a necessity if one do not wish to use double sheets of glass. To decide whether chrysoïdine is absolutely fast, or whether it will bleach in time if left exposed to the light, would require a longer test than we have yet been able to give it; but when we have made further observations on that point we shall communicate them." The same gentlemen have an article of similar purport in the *Archiv;* and Dr. Vogel, in the *Mittheilungen*, gives an account of an independent set of experiments with the same substance. [See page 64.]

In the *Correspondenz* Herren Eder and Tóth have also a report upon Dr. Heid's collodion cotton, which they pronounce excellent for wet collodion, but very unsuitable for use with dry plates.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Feb. 12	Photo. Soc. Gt. Britain (Annual)	5a, Pall Mall East.
,, 13	Glasgow	172, Buchanan-street.
,, 13	Cheltenham Amateur	Savings' Bank.
,, 14	Manchester	Memorial Hall, Albert-square.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The monthly meeting of this Association was held on Thursday evening, the 31st ult., at the Free Library William Brown-street,—the Rev. H. J. Palmer, the retiring President, in the chair. The minutes of the annual meeting were read and confirmed.

The Secretary reported that the association *soirée* had been a great success, and that the balance (about £37) had, in the expectation that the *soirée* would be an annual one, been placed in the savings' bank for future use.

Mr. H. A. Wharmby, the new President, then took the chair, and in the course of his address thanked the members for his election. After alluding to the work of the past session he threw out hints as to what might be done in the present one, concluding with wishing that the members might have a happy and prosperous year.

The Rev. H. J. Palmer then read a paper on *A Further Improvement in the Gelatine Process.* [See page 63.] Mr. Palmer, in answering questions on his paper, said that he exposed the films on the front of a glass plate. He also stated that complaints of spots from damp had brought discredit on the gelatino-beer emulsion, but he had just developed some plates that had been stored for a year in a place often filled with steam, and they were absolutely free from fungoid growth.

The President, in moving a vote of thanks to Mr. Palmer, alluded to the general wish for a substitute for glass.

Mr. J. A. Forrest facetiously replied that he thought it would be a long time before the glass-maker's occupation was gone. He remembered that when the waxed-paper process came into use glass was said to be doomed; but, though nothing was more convenient and portable than to pack negatives in a portfolio, glass still kept to the fore.

The Secretary said that after seeing the specimens of photochromes which had been lent to them by Mr. J. T. Taylor, a wish was expressed that some more examples should be shown at the meeting, and in response to a letter M. Leon Vidal had most kindly sent a collection of photochromic prints representing models in the Museum of the Louvre and goldsmiths' work.

The method of producing these was described, and great surprise was expressed at such beautiful results being obtained by mechanical means. The process was admirably adapted for producing illustrations of goldsmiths' and metal work, as by no other means could such work be so exactly and minutely represented.

A hearty vote of thanks was awarded to M. Leon Vidal for giving the members the pleasure of inspecting the beautiful results of a process which M. Vidal had been so successful in bringing to such perfection.

The noted large photograph of the Philadelphia exhibition, which Mr. F. Gutekunst had so successfully printed on one length of paper, was exhibited. It had been lent by Mr. Davis.

Some excellent prints of dead game were shown, taken by Mr. S. G. Payne, of Aylesbury.

Mr. T. Fletcher's lime light without oxygen gas was exhibited. This was sent by Mr. Lewis Hughes.

The President said that he had much pleasure in giving a welcome to those members of the Manchester Photographic Society who had so kindly come down to their meeting. He would ask Mr. Coote, who had brought with him some prints and negatives taken by the favourite process of the Manchester Photographic Society, to show them to the members.

These were excellent examples of the collodio-albumen process, and were examined with interest, the prints—*View on the Llugwy* and *Thorpe Mill*, being much admired.

Mr. W. J. Chadwick then gave a practical illustration of his method of producing oxygen gas with his compact little oxygen generator—a description of which has lately appeared in the photographic journals. He (Mr. Chadwick) also exhibited his registering carrier for the lantern, which ought to be in the possession of every lantern exhibitor, and which is described in The British Journal Photographic Almanac. Mr. Chadwick also showed one of Mr. Woodbury's new travelling cameras, with its several ingenious arrangements.

After examining these and several other interesting objects shown by the members of the Manchester Photographic Society, the meeting was adjourned until the 28th instant.

The members afterwards entertained their Manchester friends to supper at the Angel Hotel, Mr. B. J. Sayce, Dr. Rickard, Mr. W. Keith, and Mr. I. Knott, honorary members, being present.

The Rev. T. B. Banner, M.A., who occupied the chair, said that he had been asked to preside on account of his being the first President of the Association and one of the oldest members; but, as he was suffering from a severe cold and loss of voice, the Secretary had no doubt chosen him for the reason that, on that account, he could not inflict on them a long speech. He was, however, exceedingly pleased to welcome the members of the Manchester Photographic Society, and hoped that they would see more of each other, both at their meetings and, if possible, on excursions together.

Mr. G. T. Lund responded on behalf of the Manchester Photographic Society, saying how much pleasure it would give them to meet oftener, and he hoped that their respective Secretaries would be able to arrange for some meetings in the summer, when they might be able to try results with favourite processes.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

The ordinary monthly meeting of this Society was held on Thursday, the 3rd ult.,—the President, Mr. Ellerslie Wallace, Jun., in the chair.

After the minutes of the previous meeting were read and approved,

Mr. Dixon, on behalf of the room committee, reported that new gas burners had been provided for the room and that the list of members had been corrected. A vote of thanks was tendered to the committee for the improvements.

Messrs. Frank Bacon and C. M. Gilbert were nominated for membership.

Mr. Browne moved that the meetings of the Society should be held semi-monthly during the months of November, December, January, February, March, April, and May.

This being a proposed change in the by-laws the matter was deferred till the February meeting.

On the motion of Dr. Seiler it was resolved that a lantern exhibition be held at the Franklin Institute under the auspices of the Society, and it was moved by Mr. Hewitt, and carried, that the Chairman should appoint a committee to fix the time and place and make other necessary arrangements. Messrs. Hewitt, Browne, and Partridge were appointed the committee.

It was then decided to select the slides for the exhibition from the collection of Mr. Bates, who had kindly offered them to the Society.

The Chairman exhibited a number of novel and interesting pieces of apparatus, including a beautifully-made changing-box for whole-sized plates, by Mr. G. Hare, of London; an exceedingly compact plate rack; and a non-actinic shade made of orange-coloured gelatine, useful for preparing and developing plates by when travelling.

Mr. T. H. McCollin exhibited a number of successful prints from Philadelphia washed emulsion negatives.

Dr. Seiler inquired if any member had used formic acid in the iron developer for wet work, and if any gain in rapidity had resulted from its employment.

Mr. Bell, in reply, said in his hands the addition of formic acid was no improvement.

Mr. Hewitt said that a developer composed of sulphate of copper, pyrogallic acid, and formic acid was the most rapid he had ever used.

Mr. Bell claimed that, for general work, the double sulphate of iron and ammonia made the best developer in use.

The meeting was shortly afterwards adjourned.

PENNSYLVANIA PHOTOGRAPHIC ASSOCIATION.

The usual monthly meeting of this Association was held on Tuesday, the 8th ult., at the rooms of Messrs. Mahan and Keller, Philadelphia,—Mr. H. S. Keller in the chair.

The minutes of the previous meeting were read and confirmed.

The late Secretary passed over the books, papers, &c., to Mr. Thos. J. Mahan, the newly-elected Secretary, who handed them over to the Auditing Committee.

The question-box having been opened, the following was read:—"Will a print from a strong negative last longer than one from a weak negative?"

It was the general opinion that it would, the reduction of the silver being more complete with a strong negative, as it would print deeper and tone heavier. Another question was also read:—"Why does an old bath give better results when nearly worn out than when new?"

All present acknowledged it to be the case, but were unable at that time to give any satisfactory reason, and would like to hear the opinions of others on the subject. The next question read was:—"What is the cause of pinholes in the negative?"

Mr. McCollin stated that he had found, by a series of experiments, that it was often caused by sulphate of silver being formed in the bath, ascertained by traces of sulphur in the iodides; but it might also result from other causes.

Mr. Clemons showed some prints having a rich, warm, purple tone, made with a solution as follows:—

Saturated solution of borax	1 ounce.
Water	6 ounces.
Bicarbonate of soda	30 grains.
Chloride of gold	*Quant. suff.*

The newly-elected President, Mr. J. C. Steinman, was then conducted to the chair by the late President, Mr. H. S. Keller. Upon taking the chair, Mr. Steinman made a few appropriate remarks, which were received with applause by the members.

The officers for the year were then installed in the usual manner as follows:—*President;* J. C. Steinman. *Treasurer:* J. R. Clemons. *Recording Secretary:* Thos. F. Mahan. *Corresponding Secretary:* Thos. H. McCollin.

The meeting was then adjourned.

BERLIN PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held on the 21st December last,—Dr. Vogel in the chair. After a new member had been admitted,

The President announced that he had received a number of programmes of the Berlin Industrial Exhibition, intended to be held in 1879, which he would distribute amongst the members. He further laid upon the table copies of two new periodicals called, respectively, the *Illustrated Patentblatt* and the *Patentblatt.* The latter being the official organ of the patent office, it was resolved that a copy of it should be taken regularly on behalf of the Society.

Herr Zipser, Professor Vogel's assistant in the *atelier* at the Gewerbeakademie, gave an account of his experiments with Warnerke's emulsion plates, from which it appeared that the great sensitiveness of the latter was to be referred to the powerful developer. He (Herr Zipser) exhibited a few plates which supported his view. Herr Zipser also showed a few plates coated with chrysoïdine varnish. This varnish was simply prepared by dissolving chrysoïdine in negative varnish. The plates were a deep reddish yellow, as if covered with four folds of yellow oiled silk, but they still allowed actinic light to pass freely through them, as shown by Herr Zipser's experiments. This was also the case with ordinary yellow glass. The varnish seemed suitable for replacing dragons' blood as a covering for negatives, because the action of daylight, or even of the direct rays of the sun, did not bleach it.

Herr Schaarwächter showed the award he had obtained at the Nürnberg exhibition. It was not a medal in the ordinary acceptation of the word, but rather a metallic memorial tablet enclosed in a frame and ornamented with allegorical designs. In the centre the name of the winner is inscribed, and the surrounding space is gilt. The tablet was generally admired, and many conjectures were made as to how it had been produced.

Dr. Friedlander thought it was a zinc tablet upon which the design had been etched, and that it had been covered with copper and with gold by means of a galvanic battery, the gilding being done after certain parts had been covered with wax.

The President laid upon the table some new specimens of printing in colours, by Herren Albert and Obernetter. Amongst the latter's exhibits attention was principally directed to a landscape in which the blending of the tints of the foreground and the background was very successful. Amongst Herr Albert's productions was a reproduction in two sizes of a landscape painting. The smaller picture made a very favourable impression, but the larger one was not so good. In the latter blue was the prevailing tint, while in the former, from the same original, the prevailing tint was yellow.

It was supposed that this fault might have been caused by the second impression from the negative which was used for the production of the blue lichtdruck having had too short an exposure, so that the blue parts were too thin and consequently printed too dark, or that the negative used for printing the yellow part had had too long an exposure, and thus become too well covered, and so printed too light.

The meeting was shortly afterwards adjourned.

Correspondence.

Heliochromic Proofs by MM. Ducos du Hauron and Vidal.—Papier Torchon.—Photo-Decalque—M. Pellet's Formulæ for Ferro-Prussiate Prints.

The usual monthly meeting of the Photographic Society of France was held on Friday last, the 1st inst. After the voting for a new member had taken place, the correspondence was read, followed by the reading of the extracts from the foreign journals. The Treasurer's report having been presented, M. Peligot, member of the Institute of France, was elected by acclamation President of the Society for the year 1878. The selection of a portion of the committee of administration then took place, which resulted in the election of MM. Bardy, Bayard, Edmond Becquerel (of the Institute), Gauthier-Villars, and Aimé Girard.

M. Berthaud exhibited a new series of photolithographs, which were the reproductions in *facsimile* of old manuscripts, &c., and were much admired.

M. Ducos du Hauron presented some landscapes executed in colours by his system of heliochromy, and which showed considerable progress. He received the well-merited thanks of the Society for his interesting and continuous labours, and for the *Treatise on Heliochromy* which has been published, and which was accompanied by a letter describing, not without some melancholy reminiscences, the difficulties he had met with up to the present time in making his ideas accepted in the practice of the industrial arts, and connected with which there is a great opening for a commercial undertaking to work out for the public benefit this interesting process. Meanwhile, until powerful financiers in England and France carry out the scheme, M. Ducos du Hauron has organised at Agen a small establishment where the process is regularly worked.

M. Vidal presented an admirable album of his artistic treasures of France, which is a magnificent collection absolutely unique in its character and execution, and most magnificently executed by his process of photochromy.

Reports were presented by several members on the excellence of Gilbert's pencils for the retouching of negatives, and Carette's tcha-oma was very favourably spoken of after several experiments made with that material.

MM. Potok and Girond presented some *papier torchon* albumenised (resembling in a certain sense Whatman's rough drawing-paper), which realises the desideratum of several practical photographers, who eagerly sought for an easy means of obtaining beautiful coloured prints. The paper is treated and sensitised the same as ordinary albumenised paper, but must not be printed too vigorously. The toning should be pushed to the black tone. The best fixing agent is sulphocyanide, though the hypo. bath can be used. Occasionally the print on leaving the hypo. bath is yellowish in the light parts and background. When this occurs the proof should be washed in a feeble bath of common salt and water, but cautiously, because the chloride weakens and reduces the image, and even, when strong, sometimes completely destroys it. The print can be mounted on cardboard and passed through a rolling-press if it be desirable to have less roughness on the surface of the paper. The pencils recommended are the *crayons polychromes*—not too soft—and used in strong lines. It suffices to exercise some taste and a proper perception of colour to rapidly obtain portraits or landscapes coloured in the style of pastels. The prints shown at the meeting are the work of M. Potok himself; and it speaks well for the paper, being the first time he has ventured upon the domain of the painter, and the results are good.

M. Potok then exhibited several excellent proofs in black lines upon a white ground, called "*photo-decalque*," the process of Artigue, of Bordeaux, and printed directly without photographic *clichés*—that is, from a drawing in lines, or copies of prints, and very much resembling photolithographic proofs. He said he believed the process would render important service in the industrial arts, and prove useful to draughtsmen. The operations are simple, the impression rapid, and the lines of a beautiful black upon pure white. I am not aware of any means more expeditious and complete for securing *facsimiles*. Ferro-prussiate has already rendered great service, and it can and ought necessarily to render still more; but in the new process in question, introduced before the Society, may be seen this advantage—that the blue is replaced by the black, and that it fulfils all the conditions desirable to attract the attention of the Society, and therefore it is proposed that at the next meeting an experimental demonstration of the process should take place.

M. Henri Pellet said that for the reproduction of industrial designs, plans, &c., to be obtained directly in one operation in blue lines upon white paper, the sensitising liquid was composed of—

Oxalic acid	5 grammes.
Perchloride of iron	10 „
Water	100 c.c.

According to the qualities of the paper and the sensitiveness required the quantity of the liquid is modified. The oxalic acid may be replaced by several other vegetable acids, and if the paper has not sufficient body and sizing he adds gelatine, isinglass, gum dextrine, &c., to the sensitising bath. After the paper has been dried it must be kept in the dark or protected from the action of light, and this appears to be effective for its preservation for an indefinite period of time. The sensitiveness of this paper, called "*cyanofer*," is (M. Pellet said) very great. To reproduce a plan made upon transparent or on tracing paper it sufficed to expose underneath the plan a sheet of the sensitive paper; and in the sun, during summer, it requires an exposure of fifteen to thirty seconds to decompose all the parts not protected by the black lines of the plan. In winter it is necessary to expose from forty to seventy seconds. In the shade, during clear weather, the exposure should last from two to six minutes, and during foggy weather, rain, or snow the operation requires from fifteen to forty minutes. Evidently there exists also differences of light during the same day—that is to say, between morning and evening. In the light the maximum of the iron salt is reduced to the state of protoxide of iron, which is no longer coloured by a dissolution of the yellow prussiate of potass, whilst the parts protected by the lines of the design are coloured. After the exposure to the light the exposed proof is passed into a bath of prussiate of potass of a strength of fifteen to eighteen per cent. Immediately the design appears in blue, and if the exposure has been sufficient the paper can be left a certain time in this developing bath, and the lines are then stronger; if, on the contrary, the exposure has been a little too short, the paper must be left less time in the prussiate bath to avoid the blue points arising from parts of the iron salt not being entirely reduced. The washing is done with plenty of water, and the salt of the protoxide of iron is removed by a bath of eight to ten per cent. of ordinary hydrochloric acid. The ground of the proof whitens, and the lines gain in intensity. If the lines of the plan to be reproduced are made with a very black ink or one charged with yellow, the time of exposure may be prolonged, because there is no danger that the sensitive body under these lines will be attacked. In this case the prussiate development is rather long; but the blue colouration becomes very intense, and when the paper is dry the proof is sometimes more black than blue. After the hydrochloric acid bath, wash and dry. It is preferable, so as to secure a perfect reproduction of a plan, not to colour the original upon the tracing or other paper until after the photographic printing has taken place; in fact, it often arises that the tinting of a plan sometimes causes creases, and if the tints are dark—such as yellow, brown, or red—they are reproduced in blue more or less strongly corresponding to the antiphotogenic character of these colours. If there are slight or feebly-written quotations or figures on the tints they are subject to be more or less masked by the blue colouration. This direct positive process has the advantage of giving very rapidly a reproduction in *facsimile* upon which can be passed with a brush any conventional colours, and upon which any modification necessary can be executed. The process is also sufficiently sensitive to be employed in the evening by exposing the paper to the electric light. The liquid is permanent, so as to produce writing in white upon a blue ground.

The demonstration of M. Pellet was very successful, and was well received by the members. W. Harrison.

Asnières (Seine), Paris.

BROMIDE OF SILVER.

To the Editors.

Gentlemen,—As you state your belief that the "NO_3," supposed to be set free from the Ag NO_3 acting upon Ag Br, combines with organic matter in some way, you appear indirectly to give your adherence to the hypothesis which I have suggested that a pure solution of nitrate of silver in water has no fogging action upon silver bromide; or, to speak more particularly, the silver nitrate does not react on the silver bromide, at least in the way above referred to.

It seems to me possible that the silver nitrate may act by catalysis, or by the influence of its presence, the bromine ejected combining either with organic matter or with alcohol. In this way the sub-bromide might be produced, nitric acid tending to break up the organic bromine compound, with the reproduction of the normal bromide. Either of these hypotheses would account for the absence of a fogging compound in emulsions made with gelatine or with gum-arabic.

It would not be difficult to prove the action (if any) of a solution of pure silver nitrate on pure silver bromide; and the silver nitrate might be tested for quantitatively afterwards.

A somewhat similar experiment might be made upon a carefully-washed collodion emulsion, free from any liability to fog. The silver nitrate, after being allowed to act for some days, might be carefully washed out with distilled water, and then tested for quantitatively. It is needless to add what conclusions would be drawn were either the full quantity recovered, or, on the other hand, only a portion. In this case the organic matter of the collodion causes an element of uncertainty; and for this reason it might be best to use an emulsion which has been prepared with free silver nitrate. In the case of the trial with pure water this cause for uncertainty would, of course, not exist.

I should not "be surprised to hear" that a very small excess of silver nitrate added to an emulsion might be recovered without much, if any, loss—a loss hardly sufficient to lead to the belief that the fogging compound was formed *directly* by the decomposition of that part represented by the loss.

I am aware that I lay myself open to the charge of profuseness in thus bringing forward this bundle of hypotheses; but I feel that, if I do not succeed in hitting the mark with any one of them, others taking up the matter may be more successful. I, for one, should be very glad to have the opinion of others on this subject, which, now that it has again cropped up (as such subjects will, with all the pertinacity of "blisters," periodically) should not be allowed to drop without such a ventilation as may, if possible, effectually "lay" it for ever, leaving as a legacy—*a fact.*

To refer to another point in your leading article. I did not, in the eighth paragraph of my article, intend to convey the idea that "NO_3," as giving $N_2 O_2$, is a remover of fog. In the paragraph referred to I wrote that the "NO_3 would perform a part in the reaction in the way stated by you." By this I meant that it might leave the organic matter and enter into combination with the copper of the sub-bromide of copper, setting free bromine, which would combine with Ag_2 Br, forming 2Ag Br, and with formation of cupric nitrate, $N_2 O_4$ Cu o." You will see that here there can be no $N_2 O_2$ set free, as I understand would be the case with nitric acid acting on a cuprous salt. You have quite misunderstood the drift of this part of my article.

I believe you also do not quite appreciate Captain Abney's meaning where he writes of the difference in the results he has obtained before now with nitric acid and a light-impressed iodide plate from those reported by others. There is no confusion of the "two modes of development," as neither Captain Abney nor anyone else would be able to destroy with nitric acid the power of bringing up a second image by acid silver deposition on a developed plate from which the developed image had been previously removed by nitric acid. If I understand Captain Abney rightly, the supposed sub-iodide of silver forming the latent image is somewhat more difficult to oxidise than is the sub-bromide. It will not, therefore, answer to pour over the undeveloped film *dilute* nitric acid, which destroys the latent image in a bromide film. Strong nitric acid must be used, when, by its action on the pyroxyline, the more energetic oxidiser, N_2O_3, nitric oxide is set free, which oxidises the sub-iodide of silver.

I have ventured this explanation, partly because I should like to ask—What is the effect of an acid silver and pyro. application to an iodide plate from which the latent image has been removed by N_2O_3 (strong nitric acid)? Can an image be brought up by such application in the same way as it can after the developed image has been removed by nitric acid? Or is the power of development no more possible than with a strong alkaline developer? The same query applies to the bromide plate. In other words: must a *visible* image be formed (though dissolved off again by nitric acid) in order that acid silver and pyro. shall bring up an image from what I will call the plain collodion film?

I have a few other remarks to make which, if you allow me, I will leave till another week; meantime, I hope that others will join in the discussion, especially of the methods by which sub-bromide of silver may be formed.—I am, yours, &c., HERBERT B. BERKELEY.

31, *Grove Place, Brompton, S.W., February* 2, 1878.

BALLOON PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—I was very much astonished at seeing in your contemporary an article, reprinted from the *Philadelphia Photographer*, from my old friend Dr. Vogel, reporting Mr. Warnerke's progress through Berlin, of which the following is an extract:—

"Mr. Warnerke is on his way to Russia, hoping to introduce his invention in St. Petersburgh for use in the army during the present war. He thinks to make it possible to take instantaneous views of the whole battle-field by means of *a balloon, in which the camera is to be raised up to a certain height, from which, by means of electricity, the lens will be uncovered for a moment*. We shall learn, perhaps, by *his* camera. if the soldiers in Plevna have still provisions or not."

Now, early in last year I patented a method of balloon photography, of which the claim is stated in the following words:—"I claim the combination with a captive balloon of the photographic apparatus actuated by means of electricity, conveyed as required through wires supported by a rope which retains the balloon to the earth, substantially as described and shown." I also placed drawings and directions in the hands of Mr. Warnerke to manufacture the apparatus for me, and having at a late interview been assured that my work was progressing, my astonishment will hardly be wondered at. I, perhaps, felt a little stronger on the subject, considering that Mr. Warnerke had, to a certain extent, built up his reputation on the roller-slide which I invented and described in a paper read at an outdoor meeting of the Manchester Photographic Society, at Bolton Abbey, as far back as eleven years ago—many years before Mr. Warnerke was known in this country. After describing the *modus operandi* I go on to say:—

"For stereoscopic work [my pet at the time] a long glass the right width might be prepared, and equal in length to the width of five or six stereoscopic pictures. This, when taken from the glass, to be mounted in a slide specially constructed on the panoramic principle, having two rollers, one at top and bottom, round one of which the film may be wound, a portion being rolled on to the other after each exposure."

I am under a firm impression that in one of our journals or yearly *résumés* I gave drawings almost similar to the present Warnerke roller-slide; but as I have not found this I will presume that I may be mistaken.

As can be seen from many articles I have written, tissue negatives have long been a favourite subject with me, and, *en passant*, I may say that I think the method described at that time, added to our increased knowledge of emulsions, would possess several advantages, notably for enlarging or copying, which cannot be done from a surface possessing an impression from the irregular surface of paper, no matter how highly rolled.

On seeing the article quoted from the *Philadelphia Photographer* I at once wrote to Dr. Vogel, and also to a friend in St. Petersburg, and while writing the above reprint of the old Manchester paper I have received a telegram from Mr. Warnerke to say that Dr. Vogel's letter was incorrect, which I trust soon to see verified. Without intending any personalities I think the present a good opportunity to reproduce a portion of an article from the same journal as the one that gave rise to this communication:—

"Pillaging in photography, we are sorry to say, is no new thing. Sometimes, however, it is the result of ignorance: it cannot, then, be called 'pillaging,' exactly. But there are times when one person will strive to maintain a claim for an invention which he well knows belongs to somebody else. Such is the case," &c.

The article then goes into personal matters, and concludes as follows:—

"It is not a new thing for an adventurous photographer to take up a process of another and modify it, and then, by sharp practice and sometimes by an advantageous quantity of silver and gold, lay claim to the whole invention. Such conduct should be deprecated wherever met with."

—I am, yours, &c., WALTER B. WOODBURY.

South Norwood, February 1, 1878.

ABNEY'S EMULSION WITH ALBUMEN AND BEER.

To the EDITORS.

GENTLEMEN,—In your very successful ALMANAC for the present year Captain Abney contributes a formula which he highly recommends, and at the same time very encouragingly says:—"Why not make it yourself—the formula is simple?"

Now I happen to belong to that very numerous class of your readers—"an amateur"—otherwise, in all probability, I should not have addressed the following query upon what may turn out to be a very simple matter. However, I will not be ashamed to acknowledge my shortcomings and want of chemical knowledge, and will at once make known my wants.

Now I want to take the gallant Captain's advice—or, rather, suggestion—and "try" to make the emulsion myself.

The quantities quoted are quite intelligible to me until I come to "emulsify with three grains *excess* of silver to the ounce of collodion." Now here I am in a fog. How many grains of silver to the ounce am I to allow before I add this *excess*, for, rightly or wrongly, I take it that the excess of silver referred to means a quantity added as an allowance for waste when the washing takes place?

Also, further on he says:—"Try a plate, and if not satisfactory doctor with chloride of copper." Query: what strength? and under what special circumstances is it used? Am I right in supposing it is intended to doctor an emulsion that gives a *weak* negative, showing lack of vigour, or for pinholes?

I would be ever obliged if you could help a poor fellow out of his difficulties.—I am, yours, &c., "YORKS."

Halifax, February 4, 1878.

[As we have received three letters on this subject we publish the above as a representative one, in the hope that Captain Abney will kindly give the required information.—EDS.]

IMPROVEMENTS IN CARBON PRINTING.

To the EDITORS.

GENTLEMEN,—The "great respect" professed by Mr. J. R. Johnson for the "gentlemen of the Autotype Company" does not prevent him from practically charging them with stating that which is untrue.

In your ALMANAC for 1878 Mr. Johnson quotes the manuals erroneously, with a view to show that up to a recent period the Autotype Company had not solved the problem of producing tissues of certain tints in permanent pigments. To this the editor of the *Manual* replies, by quoting what the *Manuals* actually say, and pointing out that in the sixth edition, published in January, 1877, it is stated that they had "succeeded in employing the active colouring principle of madder," and asserting as a fact that "from the commencement of 1877 all the pigmented papers made by the Autotype Company, with the exception of tissues prepared by agreement to special formulæ, have been made with pigments of undoubted permanency, and certainly not a particle of cochineal colour."

In the face of this Mr. Johnson adheres to his original statement, and in his letter of the 29th January says that it appears to him that the Autotype Company fully admit the accuracy of his first proposition. He is quite welcome to his impressions, of course; we simply state the facts.

About the exceptions to our rule of making all tissues in permanent pigments: feeling that, although we were bound to supply chromotype licensees with tissues made to certain agreed-upon formulæ we ought to make them participators in any advantages we had to offer, we produced two tissues in permanent pigments only, matching very closely the Lambertype colours, and in March, 1877, duly apprised all our chromotype licensees of the fact.

With regard to Mr. Johnson's second proposition, that he cannot see how the Company are prejudiced by his recent patent: it is quite true the Company are not prejudiced by it in any way, for long before Mr. Johnson filed his provisional specification we had for ourselves solved the difficulty of making tissues in permanent pigments.

We are not in the least interested in Mr. Johnson's recent specification, which may become a good and valid patent when he has disclaimed the Wenderoth discoveries; but we decline to allow him to misquote the facts of autotype history without contradiction. We are quite cognisant of the "minute history" of the use of alizarine colours in carbon tissue, and our position with regard to such tissues is this:—

1st. That we have been in the constant practice for more than a year of producing the most brilliant coloured tissues in permanent pigments.

2nd. That for single transfer we have employed nothing but permanent pigments since July, 1876.

3rd. That Mr. Sawyer's memorandum of May 28th, 1876, sent to Mr. Johnson in Paris, gave the basis of the necessary operations for precipitating alizarine lakes in a form suitable for carbon printing, and made a formal and definite claim for having worked out such method to practical purposes.—We are, yours, &c., THE AUTOTYPE COMPANY.

February 6, 1878.

EXCHANGE COLUMN.

Wanted, a whole-plate camera and wide-angle lens by a good maker in exchange for a good studio camera with repeating back, a half-plate camera and lens, and a quarter-plate lens.—Address, W. BOND, Church-lane, New Catton, Norwich.

A pair of stereo. landscape lenses, in sliding mounts, one and a-quarter inch diameter and five inches focus, by Russell Jeffreys, will be exchanged for a studio chair or other furniture.—Address, G. HADLEY, 33, Newland, Lincoln.

A perfectly new photoscope and twelve Frith's transparencies, coloured, will be exchanged for a whole-plate or 10 × 8 camera, bellows body, swing-back, or anything useful in landscape photography. Difference adjusted.—Address, WRIGHT, photographer, Northampton.

ANSWERS TO CORRESPONDENTS.

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

BANBURY.—Exchange note unsuitable in present form. Reconstruct it.

B. B. ALLISON.—Send the camera to the maker, and get him to fit it with a new bellows body.

GEO. S. CORSTON.—See the article on *Artful Dodging*, by Mr. George H. Slight, in our ALMANAC for the present year.

THOS. ALDEN.—We are unable to indicate the name of any optician in this country who makes lenses of the kind specified.

NEMO.—A single achromatic lens will cause the marginal straight lines to be slightly curved, no matter in what position the diaphragm is placed.

J. E. G.—1. The iodide is precipitated, but is not reduced.—2. No.—3. By careful washing the whole of the soluble bromide is removed, and the two films are then alike.—4. It is found by experience that the addition of what we may term "ready-made" bromide and chloride of silver to collodion does not answer so well as when these are formed in the collodion.

T. NWORB.—No. 3 on the list will answer best as a group lens, although it is inferior to the others for taking portraits in a studio. The field of the French lens will be flattened by transferring the diaphragm from its present situation between the lenses and placing it in front of, and close up against, the anterior lens of the combination. If your description be accurate, we see no other method by which the desired effect can be produced.

A. T. M.—1. Give the negative a coating of india-rubber dissolved in benzole, and afterwards apply collodion of a thick and tough quality. When dry, scratch the film all round the margin, place the negative in water, and the film will become detached.—2. See any of the *numerous* articles on mechanical printing which we have published during the past three or four years. In these the proportions often vary a good deal, but we cannot undertake to say which is best.

M. M. C.—A sheet of talc may be employed, instead of glass, for taking negatives upon. No departure from the ordinary routine is required. If you call by appointment at our office we shall be glad to show you a collection of negatives on talc, from which it will be seen that, to employ a hackneyed phrase, it leaves nothing to be desired. *But*—and this is a serious drawback—the difficulty of obtaining perfect sheets of dimensions exceeding quarter-plate is so great that we have given up all hope of ever receiving any. Those which we possess are rather smaller than quarter-plates.

J. W. SYKES.—Our correspondent writes:—"Would the fumes from a paraffine lamp or small paraffine stove act in any way injuriously on the chemicals in the dark room? As an experiment, one day I nailed a piece of sheet iron up in the dark room and put a paraffine lamp under it. In a short time the iron was hot and the air in the room became much warmer. As I have seen gas stoves condemned I was afraid to adopt paraffine as a warming agent, fearing it might vitiate the air. It may appear a simple question to ask, but an answer in the Journal may interest and benefit more of your readers besides myself. If safe, it would be much cheaper and far cleaner than a stove and coal fire, as there is no dust. Besides, as the lamp can be lowered or put out the amount of heat and the cost of consumption can be regulated."——In reply: About five years ago we tested this matter pretty fairly, and the conclusion at which we arrived was that a paraffine lamp might be used with perfect safety for warming the dark room. Let the products of combustion be carried away and it is quite impossible that any harm can accrue to the chemicals.

H. HAMILTON.—This correspondent is about to erect a studio, and wishes for information on the subject. He says:—"I am about having a photographic studio built. The space of ground available is about fifty feet long from east to west, and twenty feet wide, bounded on the south by a wall nine feet in height, and on the north by one of six feet. At the ends east and west there are houses—a tall one at the east, a low one at the west end. I think of building it on the ground, not raising it, and intend having it about 30 × 13 feet. After a good deal of consideration I have decided to have one huge sash about twenty feet long, with a very steep pitch, and believe it would be all that is necessary. It would slope from about twelve feet or more in the centre, or nearer the south wall, to four feet six inches at the eave—no side light. I should be glad of any reader's suggestions as to the modification of these proportions. I may mention that I intend having the panes of glass about three feet by two feet. Now a sash of these dimensions to carry such large panes of glass must be very strong, so I thought of iron as combining the maximum of strength with the minimum of obstruction to light. I should be glad to know where one could be obtained, and the probable cost. There would be nine bars, but no cross-bars. I want to know the best material to cover the opaque part of the roof. I thought of slates. What is the best and cheapest glass? How should the floor be laid? The dark room will be detached. The nine-foot wall will be built in as one side of the studio. The ends will be square. Any information would oblige."

WHITE ROCK.—The stains appear to have been produced by chloride of gold.

G. W. MURRAY.—The form of your studio roof is excellent; there is no restriction to you or anyone else making use of that form, as it was described with a diagram, several years ago in this Journal. It is different from those that have been patented recently.

W. W. W.—It is so purely a matter of taste that we cannot advise you whether to use smooth or grained opal glass. The latter will be most easy to work upon; but it is probable that your clients will prefer the former. The wrapper of the lost ALMANAC, containing your name and address, has been found by the officials of the Post-office.

RECEIVED.—Alex. Henderson, Jno. Ogilvy, Sir Thomas Parkyns, J. Maxwell Jackson, F. Hamblen.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next meeting, being the annual one, will take place at the Gallery, 5, Pall-mall East, on Tuesday next, the 12th inst., when the election of officers and other business will be transacted.

HERR LIESEGANG'S MANUAL OF THE CARBON PROCESS.—It will be seen that an English translation (by Mr. R. B. Marston) of this important work will shortly be published by Messrs. Sampson Low & Co.—A few pages of advertisements will be received. For particulars see advertisement elsewhere.

PHOTOGRAPHY IN COURT.—At the Bloomsbury County Court, on Monday, the 28th ult., the case of Dickinson *v.* Woolnoth was heard before Mr. Judge Russell. The plaintiff, a photographic operator of Newcastle-upon-Tyne, sued the defendant, a photographic artist, to recover the sum of £10 for an alleged breach of contract. The plaintiff was represented by Mr. Charles Williams, solicitor, who stated that his client entered into negociation with the defendant for the position of operator and manager of his business at Camden Town, and ultimately the plaintiff entered the defendant's service in June of last year, at a weekly salary of £3.—The plaintiff stated that in consequence of the arrangement with the defendant he left Newcastle. On going to the defendant's premises he was told to call the next day, but on doing so he was informed that his services were not required. As he could not get any satisfactory information he had brought the present action. The plaintiff produced his correspondence with the defendant.—The defendant did not deny either the correspondence or the engagement, which, however was conditional on the plaintiff's references proving satisfactory. The plaintiff arrived prematurely, as the reply received from one of the plaintiff's references was of so unsatisfactory a nature that he had written to the plaintiff stating that he could not engage him. The latter, however, had not waited for this communication, and had come to London anticipating that all was right.—The Judge ruled in favour of the defendant, who said that under the circumstances he would not ask for costs.

LONDON GAZETTE, *Friday, February* 1, 1878.

PARTNERSHIP DISSOLVED.

BRADSHAW and GODART, Newgate-street, City, photographers.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

For the two Weeks ending February 6, 1878.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Jan.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
24	29·55	NW	36	39	44	34	Cloudy
25	29·35	NW	34	37	39	33	Cloudy
26	29·90	NW	34	36	43	30	Cloudy
28	29·75	SW	43	43	44	36	Dull
29	30·07	NW	33	35	42	32	Foggy
30	30·27	N	33	34	55	31	Foggy
31	30·47	NE	33	34	41	32	Dull
Feb.							
1	30·61	NE	32	35	42	32	Cloudy
2	30·37	NE	38	40	44	33	Dull
4	30·55	NE	41	42	43	40	Dull
5	30·63	E	37	39	40	38	Dull
6	30·59	SE	34	36	40	33	Dull

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 928. Vol. XXV.—FEBRUARY 15, 1878.

PRACTICAL EXPERIMENTS IN CONNECTION WITH THE SUB-BROMIDE THEORY.

We last week published suggestions from two independent sources of a method which at first sight appears to offer at once the simplest and most practical means of verifying (or disproving) what has been recently spoken of as the "sub-bromide theory." Though not given in identical terms, the experiments proposed by M. Sammann and Mr. H. B. Berkeley virtually amount to the same thing in the end, the general principle in each case consisting in the preparation of an emulsion with a known excess of silver nitrate; and the point to be determined is whether the free silver is, after a lapse of time, absorbed or taken up by the remaining constituents of the emulsion, or whether it may be subsequently extracted by suitable means without appreciable diminution in quantity.

We have said that at first sight this appears a simple and practical means of testing the theory; but it must be obvious to the most casual observer that, independently of any complications which may be introduced by secondary reactions occurring simultaneously with the supposed formation of silver sub-bromide, so many niceties of manipulation are involved in the exact determination of minute quantities of free silver contained in emulsion, or emulsion residues, that errors may easily arise of sufficient magnitude to vitiate the results of an experiment which, to be of value, must necessarily be accurately performed. We have for some time meditated a somewhat similar line of research, but have been prevented, by press of other matters as well as by some doubt as to its ultimate efficacy, from commencing it; but as the matter has now been mooted in other quarters we propose forthwith to take up the long-delayed task. It is our present intention to give a brief sketch of the course we mean to adopt, in the hope that some of our experimental readers may be induced to undertake a similar line of research, and thus form a sort of check upon our own results.

With regard to the means suggested by M. Sammann and Mr. Berkeley, respectively, we may say a word or two. The first-named gentleman simply directs that an emulsion be formed so as to leave a definite quantity of silver in excess, and we therefore presume that an unwashed emulsion is meant. Mr. Berkeley, on the other hand, proposes to add a definite quantity of silver to an emulsion which has already been washed, and which, in the absence of any fogging propensity, may be supposed to contain only silver bromide, together with the theoretical organic silver compound which is believed to conduce so greatly to the working qualities. Now, in the first case, the difficulty will be to secure the condition which M. Sammann lays down—a definite quantity of silver nitrate in excess. If we had only the soluble bromide to deal with the adjustment of quantity of silver nitrate would be comparatively easy; but it is now generally believed that a portion of the silver combines with the pyroxyline. This portion, though possibly extremely small, varies with different samples of cotton, and hence it becomes necessary to determine the exact amount before we can arrive at the precise quantity of silver actually present in the free or uncombined state. M. Sammann proposes an ingenious solution of this difficulty, based upon the differential results obtained with two emulsions containing varying quantities of soluble bromide and silver nitrate; and if the quantity of silver taken up by the pyroxyline be constant, whatever be the strength of the excess, we can see no reason to doubt the efficacy of the plan. We think, however, on the whole the better course would be to ascertain by careful tests the point of neutrality, and then to add a definite quantity of fresh silver.

Mr. Berkeley's plan of working upon a washed emulsion as a basis does away with this difficulty, as any excess of silver or soluble bromide is thoroughly removed in the washing. There still, however, remains the possibility that the pyroxyline is not in a state of saturation as regards silver; that is to say, that it may still retain the power of absorbing the latter simultaneously with and independently of the formation of sub-bromide. But this is, perhaps, opening up a new question, so we will forbear at present to pursue it further, trusting to the result of our experiments to throw some light upon it. The method we propose to adopt will consist in the preparation of an emulsion which, in its first stage, will be subjected to the action of free silver for a sufficient length of time to allow the formation of the organic compound. No acid will be employed, freedom from fog being ensured by the use of zinc bromide for the subsequent neutralisation. After the lapse of a sufficient time the emulsion will be neutralised by the cautious addition, drop by drop, of an alcoholic solution of bromide of zinc, after each such addition pouring a drop or two upon a sheet of glass and testing with bichromate of potash. As a final test one drachm of the emulsion may be precipitated in a small quantity of distilled water, boiled, filtered, divided into two portions and carefully tested for both silver and soluble bromide. By carefully following this course the error, if any, may be so far reduced as to be of very little moment.

Having in this manner obtained an emulsion in a neutral state as regards silver and bromide, it must be tested photographically; if it show any tendency to fog, as it most probably will, it must be allowed to rest until it becomes clear. Up to this point we may work upon any convenient quantity of material, and any smaller quantities used for testing purposes produce no effect upon the result. But before proceeding further we have to measure out accurately a definite quantity, to which we add a known weight of silver nitrate. If we accept as correct the formula Ag_2 Br for sub-bromide of silver, it will be evident that to convert the whole of the bromide into sub-bromide (if that be possible) a quantity of silver nitrate equal to that which has already been used in sensitising the emulsion will be necessary. But it is neither necessary nor, we think, expedient to use so large an excess, while if the quantity be too small the result will be more likely to suffer from accidental errors; perhaps a medium of four or five grains to each ounce will be found to answer all purposes.

Let us proceed then to measure out as accurately as possible (say) three ounces and a-half of the neutral emulsion, and to this add sixteen grains of silver nitrate dissolved in three drachms of hot alcohol in a test tube or flask, rinse out the flask with another drachm of alcohol, and this will make up the bulk of emulsion to four ounces, with four grains of free silver to each ounce. After a thorough shaking it may be carefully divided into two equal portions—one to be kept for the final analysis, the other to supply the material for a series of periodical tests. As a simultaneous experiment we intend also treating a washed emulsion with a similar excess of silver; in this case there need be no special precautions taken in the preparation of the emulsion, the only care being to ensure its freedom from fog before the addition of the second dose of silver.

As regards the method of testing, we think it will prove more convenient to apply the intermediate tests to small measured quantities of the emulsion itself in preference to extracting the free silver and determining its quantity separately. For this purpose take one drachm, or other convenient quantity, and add to it one drop of a strong solution of bichromate of potash, which will give a reddish-brown colouration to the whole; now proceed to add, drop by drop, a solution of known strength of soluble bromide in alcohol (shaking between each addition) until the emulsion resumes its normal colour. The quantity of bromide used will give the amount of uncombined silver, and by comparing the results of successive trials upon equal quantities of emulsion it will be easy to detect any variation in the free silver caused by absorption. The alkalimeter described a few weeks ago will be found very convenient for making these trials; but, failing that, an ordinary dropping pipette may be made to answer the purpose if certain precautions be observed.

Let a tube be chosen capable of delivering tolerably large drops when water is used; we say this because a pipette which delivers small drops of *water* will deliver them very much smaller when *alcohol* is used, a tube recently tried giving between seventy and eighty drops of water to the drachm, and over three hundred of saturated alcoholic solution of bromide of cadmium. Having selected a tube, ascertain how many drops it delivers to the drachm, *using the actual solution to be employed for testing*. This point once known will not be found to vary to any appreciable extent so long as the same solution is used.

The ultimate analysis, for obvious reasons, will be better performed by extraction of the silver from the measured bulk of emulsion. We do not, however, advise that this should be done by precipitation, but rather by pouring out and drying the emulsion in a dish or upon a plate of glass. When "set" thoroughly the pellicle may be cut up small and boiled in successive changes of distilled water until exhausted of all soluble matter, when the quantity of free nitrate may be readily determined by the alkalimeter. To complete the analysis the quantities of silver and of bromine in the remaining pellicle may be determined, and we should then be in possession of sufficient information to enable us to decide at least the question of sub-bromide.

In conclusion: we repeat our hope that some of our readers will undertake this course of experiment. It will necessarily extend over some little time, for which reason we have penned these notes with a view of enabling our co-workers to tread the same ground as ourselves. In addition to the points we have noticed it would be interesting to look for free nitric (or other) acid in the kept emulsion, as well as for free bromine. For the present we leave the matter in the hands of our fellow-experimentalists.

ON THE TRIMMING AND CUTTING OF ALBUMENISED PAPER.

How to cut up a sheet of albumenised paper economically—so as to avoid waste, and, in consequence, obtain from it the largest number of prints—is a subject which has occupied the serious attention of every photographer. The pages of this Journal and the ALMANAC contain suggestions by several writers as to the best method of obtaining the most considerable number of *cartes* from a sheet, and to such economical perfection has this special department arrived that forty-eight *cartes* may be obtained from a sheet of the usual dimensions. There are, however, other "sizes" used in photography besides *cartes*, and in the course of this article we propose to explain one of the most ingenious and convenient methods of cutting up a sheet of sensitive paper into any of the sizes usually employed that we have ever yet seen or heard described. But previous to doing so we have a few words to say upon cutting-boards.

Some mounters employ as a board upon which to cut and trim their prints a hard wooden slab, planed smooth; some, on the other hand, prefer a large plate of zinc; whilst others, again, exhibit a preference for a glass plate. This is one of those matters upon which one cannot theorise, but upon which an experienced and skilful manipulator may speak with the certainty of being listened to with becoming deference.

At the last meeting of the South London Photographic Society, Mr. W. M. Ayres, one of the most experienced of silver printers, exhibited a block of wood that he has had in use for the above purpose for several years, and which has yet shown no signs of roughness or abrasion on the surface. It measures twenty-nine inches by twenty-one inches, being about two and a-half inches in thickness. It is formed of lime tree—a wood having a close and firm texture. From his acquaintance with the properties of wood, Mr. Ayres was led to adopt the end-grain of the lime tree, for the following reason:—It is known that if the knife be frequently passed in cross directions over the surface of wood, the grain of which runs parallel with the surface, the small interstices formed by the knife passing in all directions would break out, leaving the surface uneven. This will not be the case if the wood be "end-grained;" that is, the grain standing at a right angle to the surface presented to the knife. Practice affirmed the correctness of his surmise, for he finds that, no matter how much marked by the knife the surface of the block may be, all that is necessary to completely efface these markings is to pass a wet sponge over the surface at night, by doing which it is found to have regained its original smoothness in the morning, every insterstice having been closed. For this reason a cutting-block constructed according to this principle can be most strongly recommended.

But the cutting-block is only a part of the system. Its great feature lies in the method of cutting the sensitised sheets in such a manner as to avoid any waste, no matter what the dimensions of the pictures may be, it being, of course, understood that such dimensions are those in common use.

A series of folding rules or gauges are provided, each of which, when extended, corresponds with the length or the breadth of the sheet of paper. Some of these are divided into two, some into three, and others into four parts, all loosely hinged together. They are composed of zinc, covered with leather on both sides so as to prevent the surface of the paper from sustaining such injury as would arise were metal alone employed. On each divisional piece is legibly marked its size, such as "6½ inches," "12 inches," "3¼ inches," and soforth, the aggregation of which shall equal the dimensions of the sheet. Each of these folding rules has its counterpart, because one is required for the length and the other for the breadth of the sheet, and these pairs are covered with leather of the same colour, so that when working in the dim light of the darkened room no trouble is experienced in selecting the pair required.

The method of using these gauges is as follows:—Supposing that 10 × 8 prints are required, the pair of rules or gauges, which are of (say) a red colour, and which have been divided with special reference to such dimensions of print, are selected. Four weights are now placed upon the sheet, and the shorter of these red rules is placed across the end of the sheet, and folded back so as to permit a pencil mark being made at the end of the piece pressed against the paper. The folding piece is then laid flat down, and a second mark made at its end if there be still a third piece, and so on until a pencil mark is made on the paper to correspond with the length of each division of the jointed gauge, which is then removed to the other end of the sheet, a similar course being then adopted. When this is done the longer of the two red guages is laid along the margin of the sheet lengthwise, and the various lengths of *its* divisional parts are marked off as before. When the four margins have been thus marked—which does not occupy many seconds to effect—the paper is cut by means of a knife guided by a flat ebony ruler.

It will not for a moment be imagined that a sheet will be cut up into squares all of the precise dimensions wanted; but what will be secured is that the greatest number of pieces of these dimensions can be cut out of the sheet, leaving in the form of waste different sizes useful for other purposes, such as are required for *cartes*, cabinets, or stereoscopic pictures.

A GROWING GRIEVANCE.

Our transatlantic brethren, at their annual congresses and on other occasions, manage to ventilate very freely their professional difficulties as between their sitters and themselves, without interfering in the slightest degree with those interesting technical discussions in various directions which we have from time to time reported. This practice, which has many advantages, prevails also on the continent, as the reports we give of all the important societies will show.

Various rates of charges from one end of the United States to the other, reception-room arrangements, salaries of operators, disagreements between the principal and his clients, and the styles of picture most in favour in different localities—all are fully and freely described and discussed in an amicable manner or otherwise, at the same time with troubles with the bath, difficulties with varnishes, and all the usual ills that photographers are heir to. But in England nothing of the sort is attempted, and practically the photographic press is the only medium for such discussion or for bringing before the body of professional workers points of this nature, all-important as they are.

It cannot be forgotten that the conducting of a professional photographer's business has necessarily a commercial aspect. Though we give way to none in our anxiety to uphold and improve the status of photographers in general, we must state that we consider a discussion of such points, under proper limitations, might, with advantage and without loss of dignity, be periodically initiated under the auspices of some of the leading societies.

Every person has his own mode of conducting his business, and the system which in one place proves to be successful might in another be calculated to drive every sitter away. The rules of a studio in May Fair could not safely be carried out among a population of miners; and though a successful photographic artist from the New Cut would be likely to create a sensation if he removed his establishment to Bond-street, it would not be a pecuniarily successful one. But, at the same time, if a sufficient number of leading men of any class were to interest themselves in such matters of prominent interest it might lead to concerted action of some sort which would prove of mutual benefit. It is for such purpose we allude to the subject, and our correspondence columns will be freely open to any who may desire to bring attention to bear upon any special point.

We have been led to make these remarks by the unusually loud complaints made of late of the frequency with which sitters have asked for re-sittings, apparently upon the most trivial grounds.

This is one of the most important questions possible for a professional portrait photographer with a large connection. There are still, of course, a select few who can dictate their own terms to their clients; but to the body of photographers generally this is not permissible, and some concessions have to be made. The question is—To what extent must they go? We well remember being told, in the palmy days of the *carte* mania, of a well-known artist who never sent proofs or specimen pictures out, and never took an order for a less number than fifty *cartes*, but who on one occasion, through the urgency of a lady's entreaty, so far broke through his rules as to send her one *carte* for a special purpose before the whole number was done. When it arrived it was so little liked that a message was sent to say so, and that the lady would sit again. The autocratic reply was—"I am quite satisfied with the picture, and will not trouble you to sit again."

We suppose that very few could carry out a system of such complete independence as this at the present day. There is, however, a limit to all things, and we think the number would be equally few who would be so patient as the long-suffering American photographer who, as recorded some months ago in these columns, took a lady's portrait twenty times before she was satisfied. A thorough display of the opinions and practice of leading metropolitan and provincial photographers might be expected to lead to the adoption of a more uniform system throughout the country. The topic will, of course, be interwoven with various allied subjects, such as the thorough finishing and retouching of proofs before sending as against the method of sending out plain, untouched prints to select from. Of this side issue we may quote a typical example which occurred only a week or two ago. Portraits of a fair, but exacting, lady sitter were taken in eight different styles for cabinet pictures, and rough proofs were sent to her. She did not like any, but selected three, of each of which she would have two!

This brings us face to face with the query—What is the cause of the discontent with pictures so frequently manifested of late? Is it that sitters are more exacting? or is it that there is some common existing cause? The latter is, without doubt, the case. For some time past the growing tendency of ladies' attire has been to simplicity even to severity as regards decorative treatment. The more usual dress of a lady now is one of very plain make, with little or no ornamental attachments in the body, and without any drapery about the arms to form flowing folds to break up monotonous patches; while the adornments oftenest made use of are dense masses of lace, forming conspicuous spots at the neck and wrists. Add to this that the hair is commonly treated as though the photographer were a phrenologist and desired to make an investigation of the sitter's bumps with the least amount of labour, the beautiful tresses being brushed tight and plain, and the head showing in a print or seven-eighths' view of the face an exact contour of the skull. Sitters who have been taken on previous occasions with a moderate amount of ornament (by which term we are by no means to be understood as alluding to jewellery) are astonished that the photographer has taken them so badly. "Not nearly so nice, Mr. Camera, as the picture you took of me a year or two ago"—a picture which Mr. Camera will recollect as having an artistic arrangement of hair, and with a dress amenable to a little artistic manipulation.

This, we are assured, is the cause of the growing evil, and, with the hope that it may be of some use to call attention to it, we have addressed the photographic public, again stating that we shall willingly print in our correspondence columns any not over-lengthy or diffuse communications upon some way of meeting this growing grievance.

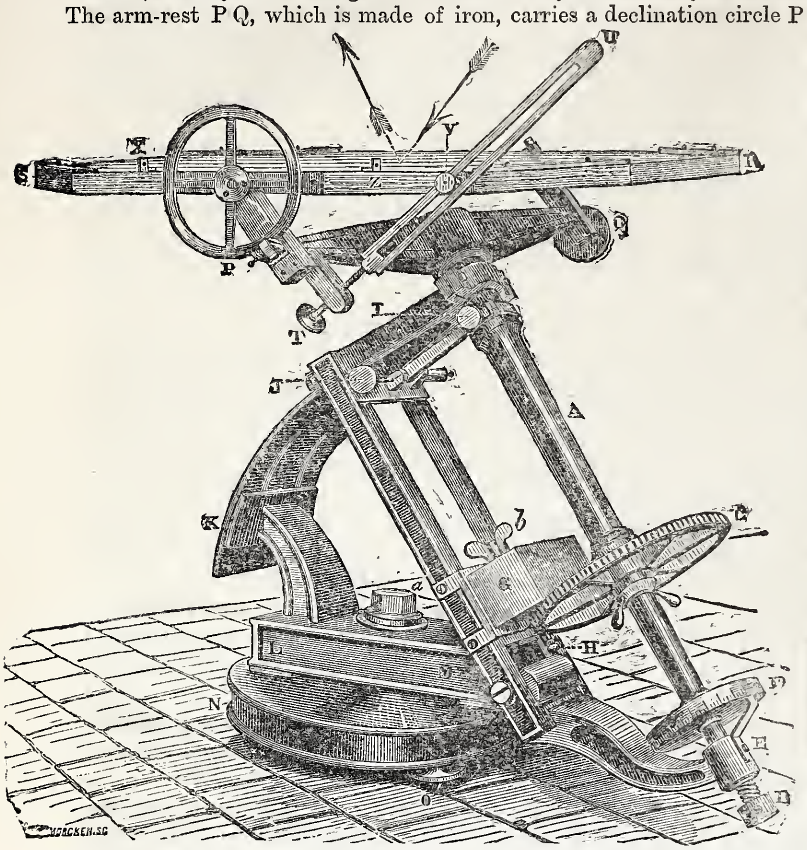
THE HELIOSTAT.

From our report of the meeting of the Photographic Society o Great Britain, held on Tuesday evening last, it will be seen that an important feature in the proceedings of the evening was the exhibition of a heliostat by Mr. Viles, who described its various parts and actions.

As much interest was shown in this instrument we annex a drawing and description of it, for which, we need scarcely say, we are indebted to our own Almanac for the present year. No apology is needed for transferring to the pages of the Journal a description of an instrument brought prominently before the leading photographic society within the present week, and which is destined to become of great importance:—

"The heliostat now to be described by means of the accompanying diagram is believed to possess all the advantages without the disadvantages of any other, inasmuch as it works with a smooth motion and can be made use of in midwinter when the sun is at its lowest equally as well as in midsummer, and also in any part of the world where the sun is visible.

"A circular cast-iron table N is supported on three screws O, and has a centre screw *a* capable of allowing the piece L M to turn. A spirit-level serves to aid in the levelling of the table. The support J K L M is of iron. The arc J K—necessary for the adjustment for latitude—is movable, but is fixed for the latitude for which the instrument is required, and when once fixed must never again be disturbed. To this piece is fixed the rest in which the axis A turns. This axis is attached at its upper end to the arms P Q, and rests at its lower end upon screw B. The wheel C is divided into 360 teeth, and is rotated by a pinion H projecting from the clock G, which is wound up by the handle *b*. Near the lower end of the axis is the hour circle D, divided into hours (and minutes) from six in the morning to six in the evening, the index E serving to indicate the time on it. The collar I works in a groove cut in the polar axis, and by fastening or setting free the screw there shown it is either loosened from or fixed to the axis. Attached to the collar is a lever which, by means of a spring, presses towards a screw J, and by the turning of it a delicate adjustment may be made. The arm-rest P Q, which is made of iron, carries a declination circle P



and an adjusting screw T U. S R is a mirror of silvered glass and of an octagonal shape. It is supported upon pivots, the imaginary axes of which pass through the plane of the mirror and at right angles to the index X Z and to the axis. By means of the screw V the mirror, when once adjusted, is clamped to the apparatus."

Particulars as to its method of action and uses are given in the ALMANAC, to which our readers are referred.

ALBUMEN AND BEER PROCESS.—ACTION OF BROMIDE ON SILVER NITRATE.

I MUST ask the pardon of your three correspondents for the lack of intelligibility in my communication which appears in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC. I am aware that my thoughts frequently outrun my pen, and that sometimes I have the misfortune to leave out "a something" which may be necessary for the easy understanding of what I may wish to communicate, though as a rule my meaning may be inferred. I may at once say that this defect on my part often entails considerable labour on me—a labour, however, which I do not grudge—as at times I have as many as five or six letters at a time to answer regarding the meaning of expressions in which my words have been twisted in almost every conceivable manner except the right one.

Your correspondent "Yorks"—hailing, as he apparently does, from a county which is proverbially noted for its cuteness in certain dealings which are not photographic—however, has asked two pertinent questions, one of which, when answered, will save him a small amount of calculation; whilst the reply to the other will, I am afraid, not put him in a way to avoid exercising a little patience or obviate the necessity of a little experiment.

The first query is—"How many grains of silver am I to allow before I add this excess?" &c.

The combining weight of zinc is 65·2,
" " Br " 80,

and the chemical formula for zinc bromine is $Zn\ Br_2$; hence its combining weight is 225·2.

The combining weight of silver is 108,
" " nitrogen is 14,
" " oxygen is 16,

and as the formula for silver nitrate is $Ag\ NO_3$, its combining weight is 170.

Now the formula for silver bromide is $Ag\ Br$, whereas that for zinc bromide is $Zn\ Br_2$; hence we must double the combining weight of silver to arrive at the quantity of $Zn\ Br_2$ necessary to form silver bromide, so that all the bromine may be utilised. By a simple rule-of-three sum we arrive at this amount:—

$$225{\cdot}2 : 340 :: 20 : x.$$

This gives x, or the amount of silver nitrate required = 30·2 grains. The excess of three grains to the ounce of collodion will give us thirty-three grains as about the amount of silver to add to the bromised collodion.

Now, as to the second query: so much has been written on the subject that I imagine I need not be very explicit on this point. Dissolve ten grains of chloride of copper, or three or four grains of iodine, in one ounce of alcohol, and add it drop by drop till the emulsion gives a perfectly clean picture. This, alas! can only be arrived at by trial and the exercise of patience. I may as well say that, as a rule, no doctoring will be required if the organified pyroxyline be not employed. The addition of copper chloride, or iodine, is not made to convert an emulsion which gives, by alkaline development, a thin image into one giving a dense image. The density is obtained by using the ordinary intensifier, as indicated in the article.

I now wish to revert to the articles which have lately appeared in this Journal, written by the Editors and Mr. H. B. Berkeley, particularly as to the disposal of a certain NO_3, liberated by the action of bromine on silver nitrate. It is very necessary to distinguish between two cases—one when bromine acts on *dry* nitrate of silver, and the other when it acts on it moist or in solution.

Some years ago (I forget the date) Mr. Spiller proved by analysis that silver bromide, when exposed to light beneath a solution of silver nitrate, caused the formation of pure silver bromide with the liberation of hypobromous acid, which may be expressed thus:—

$$Ag\,NO_3 + H_2O + 2\,Ag_2\,Br_2 = 2\,Ag_2\,Br + Ag\,Br + H\,NO_3 + H\,Br\,O.$$

In other words, where the disengagement of bromine was slow we may take it that this reaction would result. I would here remark that silver bromide, if brought in contact with hypobromous acid, decomposes it according to Roscoe. When the bromine is added rapidly to the solution of silver nitrate—such as liquid bromine being added at once—a certain amount of bromate of silver might be formed. The formation may be indicated in this way:—

$$6\,Br + 6\,Ag\,NO_3 + 3\,H_2\,O = 5\,Ag\,Br + Ag\,Br\,O_3 + 6\,H\,NO_3.$$

Now, in reference to the action of bromine on dried silver nitrate, the above reaction holds good. For experiment I powdered perfectly dried silver nitrate, immersed it in pure bromine, and left it twenty-four hours. When freed from bromine, which it soon was, by the volatilising of the liquid, the residue was analysed, with the result that both bromide and bromate of silver were formed in about the proportions indicated. One point in the experiment caused me considerable surprise, which was to find that there remained a very large quantity of silver nitrate unacted upon at all. Doubtless free particles of the powder, though fine, had their surfaces merely converted into the new compound.

Mr. Berkeley, in your last number, has rightly explained my meaning of the action of strong nitric acid on the iodide film; and in reply to his query I state that the *undeveloped* image, of the nature called "latent," is destroyed by the action of strong nitric acid in the film of iodide embedded in the organic matter called "collodion." The image refuses to develope by the action of acid pyro. and silver. The same applies to the bromide film. One further experiment I leave for your consideration. If a glass be silvered by Martin's method, and be immersed in bromine water, it will be found that we get at first, and till considerable time has elapsed, a dark-coloured compound, which reduces almost immediately to metallic silver by the action of the alkaline developer, and on which no image can be traced if the plate be exposed beneath a negative. Further: if the action be comtinued so that the silver is converted into yellow bromide, this action of the developer does not obtain. From what I can judge of at present the whole of the silver is first converted into the sub-salt, and then subsequently into the fully saturated salt, If this be the case we have a further proof that the bromine has a much greater affinity for metallic silver than has the second atom for the sub-bromide.

W. DE W. ABNEY,
Capt. R.E.

LANTERN LIGHTS, OXYGEN GAS MAKING, &c.

MUCH of my lantern practice has been connected with engagements at private parties, and my aim has been to provide as good and safe a light as possible.

Until lately I have been using the ordinary oil light, and that has been attended with a great deal of trouble and dirt; for, unless the lamps are thoroughly cleaned after using, the light is very poor. I next tried a Silber lamp of the best construction; it is far less troublesome and causes less expense, but gives no better light than the best oil lamp.

On the recommendation of Mr. F. York I tried one of the new refulgent lamps, and, after having, by a little practice, got into the best way of working the instrument, it has proved highly satisfactory. It gives a light superior to the Silber lamp, and gives a far better illumination of the disc. The wicks should be turned up slowly, and then the light will be steady; but if turned up full at first the result will be very unsatisfactory.

In making oxygen I have tried sand and various other substances, but am obliged to go back to the oxide of manganese. This, when I get a few pounds, I put into an old, thick, iron retort, and give it a good roasting. When cold I reduce it to powder, and then try it with a little chlorate of potash. The chlorate I put on a thick board of hard wood, and reduce it to powder by rolling a large bottle backward and forward over it, and this soon reduces it to powder. I find thirteen ounces of chlorate and three ounces of manganese enough to fill a small bag 24 × 18 inches, eighteen inches rise. This will hold a little more than three cubic feet, and last one hour and a-half with a jet that I have made and have lately been using with great satisfaction. The powdered chlorate and manganese are well mixed with a bone paper-knife and then put into the retort. The wash bottle is a large, round, wide-mouthed bottle, with two pieces of lead tubing passed through the cork and sealed over with melted wax and shellac. The bag is filled in about fifteen or twenty minutes, and I think it best not to put it over too strong a fire. I have been so often bothered in making connections with the usual gas, having sometimes to use forty or fifty feet of tubing, that I have entirely taken to using a spirit jet of novel construction. Three feet of gas will supply a good light for nearly two hours, and which gives a clear ten-feet picture with very little trouble. I must describe this jet in my next communication.

THOMAS GULLIVER.

OXIDATION OF THE LATENT IMAGE.

I SEE that M. Sammann has proposed a similar experiment to that suggested by me in your last number. Curiously enough, like myself, he is unable at present to practically test the correctness of any views he may be inclined to entertain. In neither case, however, is this from want of the *will* to do so.

I mentioned in my last communication that I had a few additional remarks to make; with your permission I now send them for insertion.

I think that an account of the following simple experiment may be interesting to some at the present time, as, though the fact is not unknown to many, there may be some misapprehension as to the mode of chemical action. I therefore state the experiment in order to show how nitric acid and a bromide of a monad metal probably react upon silver sub-bromide.

Silver chloride was precipitated and washed, and then exposed to light until it became violet coloured; then again washed and treated in the dark with dilute nitric acid and also with strong nitric acid. After many hours no silver nitrate could be detected on testing. Some ammonic chloride was then added, and the violet chloride gradually returned to the white state. This proves that silver cannot be dissolved out of a sub-haloid of silver by nitric acid—at least at the ordinary temperature. (The experiment also seems to render it unlikely that this action of light is to liberate free silver, as has been lately proposed by M. Lernontoff in a foreign journal). It appears that there are two entirely separate reactions—(*not* thus: $2\,Ag_2\,Cl + 2\,Am\,Cl + 2\,NO_2\,Ho = 4\,Ag\,Cl + 2\,NO_2\,Am\,o + H_2$) —the second depending upon the first, and going on together with it:—

$$\begin{cases} 4\,Ag_2\,Cl + 6\,NO_2\,Ho = 4\,Ag\,Cl + 4\,NO_2\,Ag\,o + N_2\,O_3 + 3\,O\,H_2, \\ NO_2\,Ag\,o + Am\,Cl = Ag\,Cl + NO_2\,Am\,o. \end{cases}$$

This experiment suggests some doubt as to the action of nitric acid on the latent image (supposed to be sub-bromide) in the bromide plate. Captain Abney states that half the silver of $Ag_2\,Br$ is oxidised by the nitric acid. Now, whether this oxidation be the formation of $Ag_2\,O$, or—what would seem inevitable, were $Ag_2\,O$ formed—of silver nitrate

$$(Ag_2\,O + 2\,NO_2\,Ho = 2\,NO_2\,Ag\,o + OH_2),$$

how can we reconcile any such action with the inactivity of nitric acid upon the sub-chloride in the above experiment? Again: granting the possibility of such action, why should not nitric acid act upon the sub-bromide in *emulsion* as well as upon the sub-bromide (?) in the exposed plate? For though the silver nitrate—which it seems to me must be formed, even if $Ag_2\,O$ be first formed—may be washed out of the film in rinsing, the silver nitrate might be equally well washed out of the film after coating a plate with emulsion which had been treated with nitric acid. It may, perhaps, be said that the quantity of nitric acid generally added to emulsion is not sufficiently powerful to form the nitrate. But there seems some doubt whether it is possible in any way to oxidise, or otherwise change, this sub-bromide with nitric acid alone; and as the latent image in silver bromide is undoubtedly destroyed by dilute nitric acid (I take this to be settled by Captain Abney), there appears to be good reason for doubting whether the latent image be composed of sub-bromide at all. I think the following experiment would throw some light upon this part of the subject:—Expose under a negative, or in the camera, a bromide plate until a slightly visible image is perceptible; then treat with dilute nitric acid and await the result. If the visible image were destroyed, or, on the other hand, rendered unavailable for the subsequent reduction of the image by the alkaline developer, the theory that the latent image is composed of sub-bromide would be supported, and that the sub-bromide can be oxidised in some way by nitric acid. If, however, the visible image remained unaltered in its properties, the fact would be shown that the actinic rays have two distinct actions upon the sensitive film.

There is another experiment in connection with the presumed oxidation of the latent image by various oxidisers which it appears to me would be worth trying. It is to expose a bromide plate under a negative, taking means that the plate may be replaced in the same position under the negative any number of times desired. The plate would then be acted upon by an oxidiser, washed, organified, exposed under the negative again, and then washed and "oxidised," the same operation being repeated any number of times. After a certain number of these operations it would seem that a brown image of $Ag_2\,O$ would gradually make its appearance; that is, if every two molecules of $Ag_2\,Br$ form one of $Ag_2\,O$ by oxidation. The image should then be insoluble in hyposulphite of soda, and would form very good practical evidence of the oxidation theory.

It would also be well to try the action of an oxidiser, such as potassic permanganate, upon the visible image produced by the prolonged action of light. If the action is as has been proposed by Captain Abney, the image should be no longer soluble in hyposulphite of soda. It is possible that the oxidiser may have no effect upon this visible image, when there would be additional evidence that the actinic rays have two distinct modes of action.

It occurred to me some time ago that there is an action which does not take place in practice, but which theory would seem to indicate should take place. If the primary action of light is to change $2\,Ag\,Br$ into $Ag_2\,Br$ and Br, how is it that we do not find, when testing volumetrically (say) for the combining equivalent of a sample of bromide, that a quantity of silver nitrate exceeding the theoretical equivalent is necessary to destroy all traces of soluble bromide, the testing being performed in the ordinary light of the laboratory? I do not think that more silver nitrate would be found to be converted than when the precipitation is effected in the dark room. It may be said that the silver sub-bromide is not easily formed in the absence of organic matter; this forms a difficulty, as, if any organic matter be added, the bromine ejected may combine with it, and thus get out of the reach of the silver nitrate. In order to do away as much as possible with the restraining influence of soluble bromide the bromide might be precipitated with silver nitrate in excess throughout, when, I believe, the result would be the same. The following reactions ought, apparently, to take place according to the sub-bromide theory of the action of light:—

$$4\,Ag\,Br = 2\,Ag_2\,Br + Br_2;$$

the nascent bromine should, I believe, combine with the hydrogen of water—

$$2\,Br_2 + 2\,O\,H_2 = 4\,H\,Br + O_2;$$

the hydrobromic acid thus formed would react upon the silver nitrate—

$$H\,Br + NO_2\,Ag\,o = Ag\,Br + NO_2\,Ho.$$

In this way a mixture of $Ag\,Br$ and $Ag_2\,Br$ should be formed, and consequently more silver nitrate than the quantity necessary in the dark would be required. But we do not appear to find any inconvenience when operating in ordinary light; it would, therefore, seem either that $Ag\,Br$ is not affected at all by the action of light in this case, or that it is affected in a different manner than by the ejection of bromine, with formation of $Ag_2\,Br$.

I hope that those of your readers who are interested in this subject will find the above remarks worthy of their consideration.

I should have preferred to have given an account of experiments rather than to have suggested them; and it is not with the wish that "*others* may try" that these suggestions have been given.

HERBERT B. BERKELEY.

PHOTOLITHOGRAPHY AND PROFESSOR HUSNIK'S PAPER.

[A communication to the Vienna Photographic Society.]

THOUGH the directions for use given by Professor Husnik may be sufficient for photographic purposes, still there are doubtless many of my colleagues to whom an account of the observations I have made during my last half-year's experience in practical photolithography will be useful.

If in photography it is most important to start with a good negative, it is doubly so in photolithography. And he who is not in a position to produce a perfectly clear, properly-exposed, and, in every part, equally-developed and covered negative need not waste his time on photolithographic experiments. A negative which in the ordinary silver process furnishes prints passable enough is generally scarcely sufficient for a proof upon stone. The difficulty is to produce a negative which shall be equally strongly covered in all its parts, yet in which all the lines, even the finest, shall be left perfectly clear.

If the negative can be taken in sunlight, and if all the chemicals are in good working order, one can in most cases get sufficiently-covered negatives without having recourse to sulphide of ammonia or similar aids. I give the preference to a negative not too strongly covered, if it be only perfectly clear, since by the treatment with lead and sulphide of ammonium the finest lines are apt to be somewhat covered over if the exposure be long enough for the thick lines. If, on the other hand, the exposure be too short, then the drawing in the blackest parts will be too coarse. The greatest advantage of using Professor Husnik's paper is, in my opinion, that with it absolutely opaque negatives are not necessary, as with other processes.

Though sunlight is not to be had for the taking of the negative, it is still advisable to take it in the open air, because in ordinary portrait studios it is often quite impossible to light a large, flat surface perfectly equally. As a rule, I coat the plate twice with collodion, letting it run off the plate the second time in the opposite direction to what it did the first time. Thus I ensure an equal film. For this purpose I dilute the alcohol beforehand with ether. If the collodion should be too rich in alcohol in proportion to the ether the film will dry unequally, and the necessary covering will not be produced. Since, as a rule, only one impression is required, I always omit to varnish the negatives, because they lose a little of their intensity with most kinds of varnish. Meantime, a coating with a solution of gum arabic is a sufficient protection against injury. Spots or holes in the negative do no harm, as they may easily be mended with indian ink as long as the drawing is preserved; but it is always advisable to go over the negative, very carefully spotting out all such flaws, as they are not nearly so easily removed from the stone.

The printing upon the transfer paper differs in no way from silver printing, except that a few precautionary rules must be obeyed. The paper should be freshly prepared—that is, sensitised. Even after twenty-four hours it is much more difficult to wash off the transfer colour from the unexposed parts; one has to rub harder, and thus run the risk of injuring the drawing itself. The development can scarcely be overdone, since small particles of the colouring matter lodge easily between the lines, where they are apt to be overlooked, but which make themselves very disagreeably evident on the stone after inking, and are then very troublesome to remove. Lithographers are not yet very well up in this new art, so one must not throw too many difficulties in their way.

It is in inking the paper, after exposure in the printing-frame, that most beginners err by putting on too much ink. If the lines of the drawing do not lie close together, this is of less consequence; but, on the contrary, in drawings where the lines are very close, the colour is squeezed out by the pressure which transfers the prints to the stone, and the impression has a smeared appearance. With the help of a magnifying glass this fault may be recognised on examining the stone. In such a case recourse should not be had to retouching, but after drying the print it may be inked and developed over again. I have in this way got three proofs upon stone, which were equally good, from the same paper and picture. It is very important to get the proper degree of moisture for the transfer to stone. If the paper be too wet, then the stone sucks up the moisture and does not take on the ink well. I therefore allow it to become almost dry, and then lay the sheets for half-an-hour between two damp sheets of blotting-paper. The transfer requires a good deal of care. Usually I draw the stone and paper about ten times through the press. Each time a fresh sheet is laid on and the roller reversed. It is also important, after the transfer and inking, to let the stone lie for some time amongst gum. I usually transfer in the evening and let the stone remain in the gum over night.

Photolithography cannot be employed for everything. In the first place a good original is required. Weak, grey, and smeared drawings can never give good pictures. Blue lines do no harm. Reductions of good drawings cannot be produced of equal beauty in any other way for the same cost and at the same price. I once got a composition from an artist which had formerly been drawn upon stone, and after a whole edition had been pulled it was ground off. A new edition was called for, and the artist could not make up his mind to draw the picture again. It was a beautiful summer day. At noon I fixed up the picture and took two negatives—one the same size as the original, and the other reduced to half the size. In the evening both were transferred to stone, and next morning they were printed. The painter (a friend of mine, but an enemy to photography) was then, for the first time, made aware *that at a pinch photography could take the place of art.*

J. BIRFELDER.

EDUCATIONAL USES OF PHOTOGRAPHY.

[A communication to the South London Photographic Society.]

MR. PEARSALL's paper on *Educational Aid by Photographic Exhibits* was so full of suggestive matter that it would be difficult for one person to study all the points touched upon so as to make observations upon the same.

I, therefore, propose to say a few words respecting the usefulness of photography in one or two educational points of view, and more especially in respect to its aid to the art student in drawing; and I speak practically upon this part of the subject, having studied as an artist in the Royal Academy, and also from having taught drawing in schools in earlier days.

Now, it must never be forgotten that the intention of drawing by hand is not only the correct representation of the object, but also to cultivate an individuality in the style or manner of producing such representation.

In learning to draw, the young student has first to perceive the difference between lines opposing each other and afterwards those closely approximating, and to practise the hand in its endeavours to imitate such differences; hence the first models or outlines must not only be very distinct, but the differences between two or more lines must be strongly marked.

With regard to the correct representation of any object, of course all artists must admit that no drawing by hand can equal the absolute imitation which photography gives, both in contour and shading of surfaces, and it is just because these outlines are so exquisitely beautiful in the softness or, rather, total absence of outline and submergence of one part into another that causes photographic representations to be very difficult to the young student in drawing to copy or imitate.

It will then, I think, be evident that the necessity plainly arises for some skilful and cultivated hand to prepare the early studies, as he can firmly define all outline, and the student is not perplexed, but sees at a glance what he has to do; or, rather, as drawing is, after all, nothing but the outcome of memory, which the hand is taught to obey and reproduce, so the forms which impinge upon the mind through the eyes should be well defined, and thus simplify the work which the hand is educated to perform.

The same remarks apply to shading, as it would be utterly impossible to imitate the continuous deepening of tone which nature reveals through the agency of photography. It also, in this case, becomes necessary to form or invent a manner or style of producing an imitative result by some distinctly-defined shading, which either is individual or general. Hence I arrive at the conclusion that photographs of natural objects are not the right things to place before a beginner in drawing. But as soon as the power to represent visible objects by what are really *artificial* signs has been attained, then photography would be useful as standing in the place of the originals.

But it is quite another thing to recommend the multiplication of a good drawing copy by means of photography. In this case every variation in touch—even the gradual wearing away of the pencil or crayon—becomes evident; and the expression, or what is called the "feeling," of the artist can be seen, as also the possible repetition of lines, by which he arrived at his final outline. In this way photography can do splendid service as an educational aid. I cannot but think that there is a future for photography in supplying such an evident want. The difficulty to be overcome will be in producing at a commercial price the number of copies. However, in view of the immense strides which mechanical printing through the agency of photography has recently taken, the means may very soon exist by which artistically-arranged and technically-adapted natural existing objects may be multiplied and brought out as useful and necessary aids to educational study.

Mr. Pearsall says:—"Lithographic copies are given to be copied with the lead pencil." I quite agree with him that this is wrong, and equally errs, although on the opposite side, with photographs from objects, because the mode of production being different how can the imitative results be equal?

Again: it is stated—"That photography would aid in correctly training the faculties of observation." Here every one who gives a thought to the matter will agree with such statement, more especially in botanical studies, where photography renders the minutest form and development of parts with such marvellous fidelity. But here comes in the point of view I have taken with respect to drawing. All these photographs should be produced under certain conditions of representation which would show them as distinct and separate from surrounding objects, so that the individuality of the object should be taken in at a glance.

As an aid to botanical studies, where stems, leaves, blossoms, and flowers can be so beautifully shown, we have had strong evidence of the capabilities of photography in the many really exquisite examples recently seen at the photographic exhibition, but which, for the purpose of being useful for educational purposes, would require to be treated both from their own perfectly natural positions and also from some more conventional way of representation, for the purpose of classification and distinctness of form.

Then, take photographs of surgical cases as an educational aid to the medical student. Here difficulties arise in the matter of colour, which becomes so great a help in the diagnosis of disease. I recollect, many years since, when, as a young artist, being engaged to attend at the Ophthalmic Hospital to make drawings of diseased eyes, I was much surprised to have eyes put before me which to all appearance were perfectly correct, but which, upon closer inspection, proved to have some very small irregularity in the colour of the pupil. This necessitated much care and skill to make evident on paper. Here photography would have been comparatively useless; but, where conformation or abnormal form is all that is required, photography must be invaluable, as all the parts being taken at the same time their relative size and position become correctly represented.

Photography, then, I consider, becomes applicable as an educational aid, and especially in its relation to drawing, when facts have to be recorded and the *objective* side of knowledge is in operation; and it is because those photographic facts are so purely objective that therein lies their great power and usefulness. But the very moment that the *subjective* side of knowledge is cultivated—where expression and the consequent development of individuality becomes a necessity—then photographic records must give way to those produced by the human hand, which, being guided by the mind, becomes imbued with a vital meaning; in other words, give evidence of the wide gulf which must ever separate matter from mind.

At the same time there remains much good and true work which photography can do, and the only thing at the moment to be brought about by such discussions as these is to define the proper and legitimate road along which our art-science, by steadily pursuing its way, will ultimately arrive at a position where its utility will be recognised, and its work accepted as helping forward the progress of education.

EDWIN COCKING.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE annual meeting of this Society was held on Tuesday last, the 12th instant,—Mr. James Glaisher, F.R.S., President, in the chair.

Mr. Frank Bishop having been elected a member, the reports of the Treasurer and the Council were read and adopted. These will probably appear in our next issue.

Votes of thanks to the Secretary, the Treasurer, and the Auditors (Mr. R. Murray and Mr. F. Beasley) were then awarded.

It was proposed, and unanimously adopted, that the service medal of the Society be awarded to Mr. Henry White, a former treasurer, as an acknowledgment of the valuable services rendered by him in that capacity.

The CHAIRMAN said that the Council had unanimously decided that the progress medal of the Society should be awarded to Captain Abney, on account of the originality and value of the scientific researches in photography made by him and submitted to the Society.

This announcement elicited much applause.

Captain ABNEY thanked the members for the honour they had done him, but begged respectfully to decline the medal for the reason that, if they remembered, the proposal to make an annual award of a medal for progress was made by himself, and owing to this he did not consider it was fitting that he should be the first to be thus honoured.

The members, however, would not receive Captain Abney's declinature of the medal, which he was eventually compelled to accept.

Captain ABNEY proposed that the sum of seven pounds be set aside for two prizes—respectively of five and two pounds—to be offered in connection with the technical examinations conducted by the Society of Arts. This would enable them to include photography in its scientific and practical bearings in the branches of technical education. For an examination as to the competency of photographic students every facility existed.

Mr. FRANCIS BEDFORD seconded the motion, which was agreed to.

Captain Abney exhibited a large transparency of the sun, executed by M. Jansen.

Mr. W. S. BIRD, on behalf of the scrutineers of the ballot, announced that Mr. Francis Bedford had been elected to fill the vacancy among the Vice-Presidents caused by the retirement in rotation of one of that body, and that the seven vacancies created in a similar manner in the Council would be filled by Messrs. Blanchard, Dallmeyer, Davis, England, Fry, Mawdsley, and Pritchard.

Mr. E. Viles then exhibited a heliostat and explained its application to such photographic purposes as the production of solar enlargements, whether of a microscopic kind or large carbon pictures. He also exhibited and explained the action of the solar microscope employed by him in obtaining the negatives from which were printed the pictures for which he was awarded a medal at the recent exhibition. The heliostat exhibited by Mr. Viles has been described, with a drawing, at pages 31 and 32 of our ALMANAC for the present year, and which we reproduce in our current number.

Two other heliostats—one of them possessing great simplicity of construction—were exhibited by Captain Abney. Concerning these we shall have more to say hereafter.

The CHAIRMAN proposed the thanks of the Society to Mr. Viles.

A large collection of the most recent works in *photochromie*, by M. Leon Vidal, were exhibited and examined with much interest.

The CHAIRMAN tendered the thanks of the Society to Mr. J. T. Taylor, who had been the means of such a collection being brought before the members, and to Mr. Hore, who had kindly attended to exhibit these specimens.

A vote of thanks to the Chairman for his services as President during the present year, proposed by Mr. Bird and carried by acclamation, brought the proceedings to a close.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of this Society was held on Thursday, the 7th inst.,—the Rev. F. F. Statham, M.A., F.G.S., President, in the chair.

With a view to opening a discussion on Mr. Pearsall's paper on *Educational Aid by Photographic Exhibits*, Mr. E. Cocking, Secretary, read a paper on the same subject. [See page 76.]

The CHAIRMAN spoke of the great advantage of photography as a means of multiplying works of art which could not otherwise be multiplied except by a great loss of time. The conventionalism that existed in modes of treating subjects, such as trees, by artists militated against the employment of photographs from nature as copies for young artists; but, if such photographs were employed as studies, there was no doubt that a better and more accurate system would be brought about. It was only by degrees the conventional method alluded to had been adopted, and by a more extended use of photography in copying from nature a closer approximation to nature would be attained in our works of art than is now the case.

After a few remarks by Mr. Cocking, and no other member speaking on the subject,

Mr. PEARSALL, in reply, said that he was gratified by the interest that had been taken in the communication he had made, as shadowing out the advantages to education by photography, by the discussion and papers there and elsewhere, and he thought he could discern in several quarters the entertainment of the question. He had but little to reply to in the shape of answering objections; but he might explain that he did not wish in any way to reflect upon the education of artists or on high art. What he had contended for was to place drawing upon a footing to be taught like writing, and, as these forms were to represent language and ideas, that drawing should be able to express forms of nature and facts of daily life by ready symbols or pictorial means. He pointed out the practice deemed necessary to acquire music, where the vast volumes of noise and amount of error vanished in daily practice, and the early copybooks were thrown aside; but, with drawing, to attain the proper practice and to correct errors, the amount of wasted material was so great that the child was too early allowed to draw, and thus the errors were made painfully permanent. All parties were dissatisfied, and few pupils acquired power to draw when alone, and very few persons were found to retain sufficient power to draw in after years. What he asked for was the simple means of drawing lines to be used to express forms, and shading to give the solidity that could not be given by mere outline. Photography would furnish subjects for copies of unexpected and beauteous novelty, and thus students, children, and teachers would be interested and rewarded. Still, if it were necessary to defend the employment of enlarged photographs in place of casts and statues, he thought that such copies had advantages. Taken for the million—from the best subjects of study or life, in the best lights, and selected with critical care by a professional artist—they would not at least present the repellent aspects of too many pieces of sculpture. Horses flying along, yet permanently and necessarily supported by a trunk of a tree, or impaled upon bars of iron! It did require an imagination and time that ordinary students did not possess to overcome the violent aspects of many of these works of art—too many loaded with dust and a complexion of polished dirt seen nowhere else, and the parts recessed instead of deep shadows showed velvet, dusty aspects, or even absolute whiteness. He named the clever painting of a *Tomb in the Church of St. Roch, Paris*, where the visitor was called upon to admire how effectively the painter had imitated the dust and dirt of ages upon the portions receiving the lights. Having been induced to look at the state of photography in its many pleasing aspects as a new power to civilisation, he found the capabilities to aid education so many and so strong that he might be permitted to add the weight of one of their leading scientific men—that while for language and ideas we had classic models, and for music mathematics and geometry, we had logical rules for training. In the mechanical arts tools and machines and materials could be properly applied, yet for natural and experimental philosophy, as required at the present day, they had no recognised means to test the fitness of a youth for science. It was believed that of all the means that could be employed to teach, the art of photography was the best; for, if the young student had not the habit to be interested with the experimental training to produce such true and valued transcripts of nature as could so readily be obtained, it might safely be inferred that he was not well fitted for delicate manipulations to obtain true results. Photography might thus afford the means to show how much confidence the student had in himself, and it enabled his friends to form an estimate of the confidence to be placed in him and the results he might obtain. Taking a wider view, he ventured to think photographers had reason, in these dull times, to be satisfied with the position of photography, aided, as they were, by the noble army of enthusiasts and amateurs to encounter all expenses and difficulties, to obtain results, to develope truths, and to advance good practice. He thanked them for the marked attention with which they had been pleased to honour him.

A vote of thanks was tendered to Mr Cocking and Mr. Pearsall.

A fine and large photograph of the celebrated group, *The Laocoon*, was exhibited by Messrs. Mansell and Co.

A large collection of choice photochromes by M. Leon Vidal, of Paris, was submitted for examination by Mr. Hore.

Mr. R. Kennett, alluding to a statement that had somewhere been made relative to the improbability of dry plates being ever used in the studio, exhibited a number of negatives of portraits which effectually contravened such a statement. He also exhibited a variety of negatives of groups and landscapes of excellent quality. These were all taken on dry gelatine plates.

Mr. Pearsall exhibited two diffraction gratings—one of which had been ruled by a diamond point, the other being a photograph. They contained four thousand lines to the inch.

Mr. Bolas directed attention to the recent patent of Mr. J. R. Johnson, and exhibited a transfer from a negative obtained by following the directions given therein. The negative was a copy of Captain Waterhouse's article in The British Journal Photographic Almanac, and a curious thing about it was that the negative, which had been strongly intensified, was split into two pellicular halves, one half remaining attached to the glass plate, the other being removed on the gelatine. Both possessed printing intensity. [This curious negative may be seen at our office.]

Mr. W. M. Ayres showed a large block of end-grain wood suitable for trimming prints upon. A brief description of this will be found in another page.

Messrs. Wratten and Wainwright exhibited a collection of prints obtained from washed emulsion negatives. These comprised groups, landscapes, and architectural views.

After votes of thanks to the various gentlemen who had made exhibits the proceedings terminated.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

The annual general meeting of this Association was held on Wednesday, the 6th inst., at 160a, Aldersgate-street, E.C.

The minutes having been read and confirmed, the balance sheet was placed before the meeting. After being examined by the members the following resolution was carried, having been proposed by Mr. O'Connor and seconded by Mr. Howard:—"That the balance sheet be taken as read."

The reports of the Secretary and Board of Management were next submitted to the meeting, and it was proposed by Mr. Ralph and seconded by Mr. Evans—"That the Secretary's report and the report of the Board of Management be passed." Carried unanimously.

Annexed are the two reports:—

Secretary's Report.

Gentlemen,—You will hear the report of the Board of Management. I wish, however, before that is read to make a few remarks on the condition and prospects of the Association financially, as regards its past, present, and future state.

In the year 1876 the actual receipts were £39 15s. 1d., and the expenditure £58 1s. 5d., thus reducing the balance in hand from £68 16s. to £50 9s. 8d. For the year 1877 the receipts, though less than those of 1876, show an improvement in the most vital part, viz., subscriptions from ordinary members. The actual receipts were £35 13s. 4d., and expenditure £38 9s. 2d., the latter exceeding the former by £3 5s. 10d. as compared with last year's difference of £18 6s. 4d.

As to the prospects for 1878, I can safely assert that the expenditure, as far as working expenses are concerned, will be considerably reduced. The rent, which for last year reached the sum of £7 18s., will this year be only £3. This is not the only advantage attached to the removal of the offices of the Association, as all must admit who have visited the former and present offices. Another point upon which I wish to remark are the expenses incurred for printing during the year 1877. Several alterations in the rules having been made at the last annual meeting, a new edition was printed. That would, of course, be a heavy item, but one not necessary this year, and consequently there will be a reduction of expenditure in that direction also. Copies of the rules can now be obtained at sixpence each, and I should strongly advise those gentlemen not possessing one to obtain the rules immediately, and to further the interests of the Association by circulating them amongst their friends, who probably by that means would become members.

In conclusion: I trust to be able at the next annual meeting to show an improvement in all points. I would impress it upon you that the expenses would be but slightly increased should the Association become of twenty times its present strength. H. Harland, Secretary.

Report of the Board of Management.

The Board of Management tender their thanks to those gentlemen who have kindly contributed to the funds during the year, and trust by a continuance of that support to be enabled to further develope the benefits of the Association.

Since the formation of the Association the sum of fifty pounds has been granted for relief, in amounts varying from £7 10s. downwards, to meet the requirements of the applicants, due precaution having first been exercised. The Board of Management feel confident that the manner in which each case has been considered and finally dealt with will meet with the approval of all members.

The number of applicants for relief during last year (1877) being somewhat less than previously is attributable to the fact that, by means of the Employment Register, its members have been engaged, thereby rendering such application unnecessary. This fact should recommend itself to photographers generally; and, taking into consideration the small sum requisite for membership, and the knowledge that if one does not require assistance he is at least helping his poorer brethren who do, the Board would, therefore, urge all members of the profession to join the Association, feeling confident that it is only the want of being more generally known that prevents its strength being considerably augmented.

The subscription to the Association for an ordinary member is three shillings quarterly, or five shillings and sixpence half-yearly, or ten shillings and sixpence yearly. The advantages offered are—substantial relief when a member needs it; railway fares to enable a member to reach a situation at a distance; a list also being kept of vacancies at the office. Applications sent to the Board receive prompt attention.

The Board of Management, in bringing its term of office to a close, would urge upon the members the necessity of their active co-operation in the future, and would request them to make known as widely as possible the purposes for which the Association has been formed, and to forward to their utmost the interests of this Association.

There is still one of the objects of the Association that has not yet been developed, viz., granting annual pensions to aged members or their widows. To carry out this object the Board is anxious to form an *invested fund*, and respectfully solicits donations and subscriptions, which will be thankfully received by the Hon. Treasurer, H. Baden Pritchard, Esq.

W. M. Ashman, Chairman.

A letter from Mr. Bassano, of Old Bond-street, was read to the meeting, in reference to his proposal to hold an exhibition at the above address, all surplus profit from the exhibition to be handed to the Photographers' Benevolent Association.

The Secretary was instructed to thank Mr. Bassano in the name of the Association

Robert Millard was struck off the list of members for unsatisfactory conduct.

Messrs. Windridge and Foxlee were elected as ordinary members of the Association.

The election of officers for the ensuing year then took place, with the following results:—*Vice-Presidents:* Rev. F. F. Statham, M.A., F.G.S., and J. H. Dallmeyer, Esq., F.R.A.S.—*Trustees:* Colonel Stuart Wortley and Captain W. de W. Abney, R.E., F.R.S.—*Treasurer:* H. Baden Pritchard, Esq., F.C.S.—*Auditors:* G. Taylor, Esq., and L. Sisman, Esq.—*Board of Management:* Mr. W. S. Bird *(Chairman)*, Mr. W. M. Ashman *(Vice-Chairman)*, Messrs. H. J. Burton, T. Bolas, J. D. Fage, T. S. Hicks, J. A. B. Hall, E. D. Lavender, O'Connor, D. Rheinlander, J. Rolph, and H. J. Thorne.—*Secretary:* H. Harland.—*Travelling Agent:* Mr. Ramm.

The proceedings of the evening were brought to a close by Mr. Fage proposing a vote of thanks to Mr. Ashman, the Chairman, which was passed unanimously.

The meeting was then adjourned till March 6th, at 8 p.m. To that and other meetings the Board earnestly invite all photographic friends.

BALANCE SHEET FOR YEAR ENDING DECEMBER 31, 1877.

Jan. 1. *Receipts.*	£	s.	d.
Cash in London and City Bank.	50	9	8
Subscriptions from honorary members	19	11	0
Subscriptions from ordinary members	15	14	10
Sale of Rule Books	0	7	6
	£86	3	0

Expenditure.	£	s.	d.
Rent of 174, Fleet-street, 10 months	7	8	0
Rent of 160a, Aldersgate-street, 2 months	0	10	0
Advertising	2	11	0
Stationery	0	14	2
Printing	3	7	6
Postage	2	7	5
Petty Expenses	0	12	3
Relief	12	10	0
Secretary's salary	8	18	10
Balance in London and City Bank	38	15	8
Cash in hand	8	8	2
	£86	3	0

Audited and found correct, G. TAYLOR,
L. SISMAN.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE fourth ordinary meeting of this Society was held in 5, St. Andrew's-square, on the evening of Wednesday, the 6th inst.,—Mr. J. Lessels, President, in the chair.

The minutes of the previous meeting having been read and approved, Mr. W. W. Halliburton was unanimously elected an ordinary member of the Society.

Mr. W. GILMOUR then gave an address on some properties of glass, of which the following is a summary:—After an apology for not having something more immediately bearing upon photography to bring before the meeting, he (Mr. Gilmour) stated that he intended to take them to a closely-allied subject, and would make all his remarks *On Some Properties of Glass* correllate as much as possible around lenses. A lens in its simplest definition, it was explained, was a glass so prepared that the rays of light passing through it were refracted. All simple lenses, however, did more than refract the light passing through them, for they also dispersed it, owing to the unequal refrangibilities of the different rays which formed ordinary white light. This property of refraction and dispersion was shown by means of a ray of light from an oxyhydrogen jet, the amount of refraction being determined by the distance the ray of light was bent out of its straight course, whilst the dispersion was determined from the length of the band of colour produced by the accompanying decomposition of light. Newton, who first discovered the compound nature of light, held that refraction and dispersion were both reciprocal and proportional; that is, there could not be refraction without dispersion, nor could there be dispersion without colour, and, further, the dispersion was in a corresponding ratio to the refraction. The apparent truth of this theory was shown by the refraction and dispersion produced by transmitting light through different media—such as glass, water, bisulphide of carbon, &c.—by means of which it was shown that where a ray of light was much refracted the dispersion was correspondingly great, and *vice versâ*. Nearly half-a-century later, however, another philosopher discovered that by combining substances of unequal refractive and dispersive powers the dispersion might be got rid of, leaving still a considerable amount of refraction; and, referring to the very interesting donation which had recently been made to the Society in the shape of a lens achromatised by means of water, he (Mr. Gilmour) stated that he had referred to the principle of achromatism merely to show the achromatic action of the water. This was done by a very interesting and beautiful experiment, in which the decomposing action of the lens was first shown, then the achromatic action of the water, and, lastly, the residue of refraction after the lens was properly achromatised. Referring next to the refractive action of all transparent substances, it was stated that they might all be classified into two divisions, namely, those that were single refractors and those that were double refractors. The single refractors required no explanation, but the double refractors were illustrated by passing the light through a crystal of sulphate of lime, and double refraction itself explained and illustrated in various ways. This was done for the purpose of explaining the remarkable property of glass whereby it might be resolved either into the division of single or double refracting substances. A perfectly homogeneous plate of glass, for example, was shown by several experiments to be capable of being converted into a double refracting plate, this being done by pressure, heat, &c. The process of annealing glass was next referrred to, and illustrated by several very interesting and beautiful experiments, and the whole of the remarks on double refraction were briefly summarised in their practical bearing on, and application to, lenses as stated at the commencement.

The address was illustrated throughout by very numerous experiments—some, in which the polariscope was introduced, relating to the formation of crystals and to various kinds of glass, both annealed and unannealed, being of a most interesting and beautiful nature. It was shown that light passed through crystalline bodies much more readily when directed vertically to the plane of cleavage, due to the molecules all lying in one direction. When a ray of polarised light was passed through a piece of annealed glass the screen exhibited a white light, but by causing a screw to press on the edge of the piece of glass the light suddenly became beautifully coloured in consequence of disturbing the equality of its density. The coloured rays had a common axis which formed the centre of a black cross, the latter indicating where the light was intercepted. Where a piece of unequally-cooled glass was examined a similar effect was seen, but each piece had its own distinctive form and structure. Thus a circular plate of glass had one axis, from which, as a centre, coloured circles were described; an oval plate, on the contrary, had two axes, around which there were the coloured rings severally described with mathematical precision.

In answer to Mr. Pringle, Mr. GILMOUR said he believed the visual and chemical foci of a lens might be modified if it were screwed too tightly or unequally in its setting.

Dr. THOMPSON directed attention to the advisability of allowing sufficient room for the expansion of the lens by heat, so that the brass cell might not derange its quality. He also referred to the iridescent glass of Herculaneum, Pompeii, and Carthage, the peculiar property of which, he believed, was due to oxidation.

An interesting conversation then ensued on the change in colour some kinds of glass underwent when exposed to light. One very notable example of this was to be seen in the large plate glass window of a hosier's shop in Princes-street, which, from being at one time colourless, was now so deeply coloured that all white articles seen through it appeared of a deep rosy lavender colour.

Several members had noticed that the glass most free from colour when new was the soonest deteriorated when exposed to light.

Mr. M. G. DOBIE proposed that a presentation print be given to each member of the Society, and desired that it should be of a very high-class character, worthy of such a large and prosperous Society.

Mr. A. MATHIESON proposed that the print be mounted with an appropriate title, &c., so that it might not only represent the most advanced state of the art, but be finished in the best manner possible, as is usual with first-class presentation prints, and be issued ready for framing.

Both these propositions were carried unanimously, and the matter was referred to a committee to make choice of a subject, and to carry out the wishes of the Society.

Votes of thanks to Mr. Gilmour, for his interesting and instructive lecture, and to the Chairman, terminated the meeting.

VIENNA PHOTOGRAPHIC SOCIETY.

THE usual meeting of this Society was held on the 11th December last,—Dr. Hornig in the chair.

The minutes of the previous meeting having been read and approved, and some business of no general interest having been transacted,

The CHAIRMAN intimated that it had been thought advisable to add to the numbers of the committee appointed to adjudge the Voigtländer prizes.

The additional names were those of Dr. Bauer, Professor Husnik, and Herren Leipold, Martin, and Scamoni, who may be regarded as experts, and were principally required to decide upon the *Treatise on the Reactions of Chromates upon Substances of Organic Origin.* The final award was postponed to allow all the members of the jury to read the treatise.

The CHAIRMAN also announced the arrival of another competing work after the time fixed for receiving such; but after some discussion it was agreed to admit the belated work, as the judges had extended their time for deliberation.

Several bottlesful of a new preparation of Professor Husnik's for producing copy-negatives by a dusting-on process were laid upon the table, and any member inclined to experiment was invited to take a bottle with him and to report on the results obtained. Professor Husnik had also sent a number of negatives produced by his process, and an essay on *Lichtdruck in Natural Colours*, which was read by the Chairman.

Several copies of a pamphlet, by Professor Steinhauser, on the mathematical proportion between the stereoscope and stereoscopic pictures, were also distributed. Dr. Eder had undertaken to make a report on the subject, but was prevented by illness. A communication was also read from Herr Brandt, of Bayreuth, in which he described his experiments in direct printing from glass negatives.

A number of other objects were exhibited and commented on, but nothing of general interest, and the meeting was shortly after adjourned.

AN extraordinary meeting of the same Society was held on the 29th December, in order to give Baron Stillfried an opportunity of exhibiting a Warnerke travelling apparatus, which was examined with great attention.

Dr. EDER then said that Professor Steinhauser based his calculations, on on the one hand, on the mathematical connection between stereoscopes and pictures on the focus and distance of the lenses by which the picture was taken, and, on the other hand, on the focus and distance of the lenses of the stereoscope and the height of the box. Thus Dr. Steinhauser showed that to give a perfect idea of the original object stereoscopic pictures must conform to the following conditions:—1. All the pictures should be taken by lenses of the same focus (say fifteen centimetres).—2. All half-stereoscopic pictures should be the same breadth (say seventy-five millimetres).—3. Whenever possible the focussing point of the lens should be taken at the same distance (about eighty millimetres). When this is not practicable on account of the greater distance, the distance should always be given.—4. The distance of the principal point of the object should be approximately ascertained and given.—5. When the union is not got by the objectives their focus should be given.

Herr ZAPPÉ thought that for distant objects the lenses should be focussed to suit the eyes.

With regard to the controversy on the power of boiled water to absorb air-bubbles,

Dr. EDER said he had never denied that boiled water might be useful in removing air-bubbles from blistered paper, but only that that was wholly due to the great absorbing power of water for air; and in support of his opinion he mentioned the following experiment, which anyone interested in the subject might easily repeat for himself:—Take a watch-glass and tilt it backwards, convex side up, so as to enclose some air upon a vessel containing boiled water; and at the same time place in the same water a piece of blistery paper, according to Baron Szetter's directions. In this last case the air-bubbles will be pretty quickly absorbed, while in the first case a bubble of one cubic cent. would not be absorbed by a litre of water in twelve hours, much less in ten minutes.

Dr. EDER then showed a sample of chrysoïdine and of paper and gelatine coloured with it, remarking that experience only would show whether chrysoïdine would bleach with long exposure to the light.

Several other objects were exhibited, and shortly after the meeting was adjourned.

Correspondence.

M. LAMY'S SUBSTITUTE OF OX-GALL FOR COLLODION AS A TEMPORARY SUPPORT IN THE CARBON PROCESS.—M. DARLOT'S NEW RAPID HEMISPHERIC LENS.—M. BERTHOLET'S DISCOVERY OF PERSULPHURIC ACID.—NEW PHYSICAL OBSERVATORY FOR FRANCE.—AN *OUTRÉ* DEVELOPMENT OF PHOTOGRAPHY.

AT the December meeting of the Photographic Society of France M. E. Lamy communicated the result of his researches for substitutes for collodion in the preparation of glass plates as the temporary support in the carbon process. Amongst the substances he then indicated to form the necessary coating, the last-mentioned, namely, ox-gall, has not since that date, even with new samples, given him invariably good results. The ox-gall he used in December was an old one and smelt very badly, and as long as this lasted it gave him entire satisfaction; but from the moment it was all used, and that he was obliged to replace it with another sample he was unsuccessful. The new gall was fresh and without smell. He then procured a third one, smelling badly; but even with that the result was still not as satisfactory as was desired, for the images creased during the development in the warm water. This irregularity of action was not astonishing, after all, when he found that some samples of ox-gall were acid and others alkaline, and that they were, besides, more or less charged with fatty and albuminous matters. He overcame the difficulty, however, in the end, and he now succeeds regularly in the preparation of the coating for the temporary support with ox-gall.

In ox-gall of about 500 cubic centimetres its two principal component parts are separated by the reaction of 30 c.c. of glacial acetic acid, or by 100 c.c. of strong vinegar, causing a yellow precipitate of acid fatty matter, which is separated by filtration through paper. This filtration is slow, but when it is terminated the filter paper and the filtrate matter is taken from the funnel, placed in a vessel, washed with distilled water, and the whole poured into a new filter paper. He is obliged to proceed in this way, for the washing of the precipitation cannot be either quickly or effectually done by filtration alone, as the first filter paper soon gets clogged up. The deposed fatty matter, after being several times refiltered, is filtered once more—this time with 250 c.c. of liquid ammonia at 22°. All the matter is dissolved, and if the ammoniacal solution be first slightly warmed on the hot sand bath the dissolution is more rapidly effected.

Dissolve in another receptacle one gramme of alum in 250 c.c. of distilled water, which is then added to the ammoniacal solution. The mixture is slightly cloudy, but this disappears by agitation; and thus prepared the solution is ready for use.

When fresh ox-gall is used, and consequently without a bad smell, the precipitation caused by the acetic acid is of a yellow lemon colour, and not very abundant; the filtered liquid is of a fine green. A fresh addition of acetic acid does not cause any additional precipitation; but if the ox-gall has been left to age until it smells strongly, the precipitation obtained is of a greenish-yellow colour and very abundant, and a little acetic acid may be added to the filtered liquid until it is no longer cloudy. When this state is attained the filtered liquid is no longer green, but clear, or slightly yellow. Therefore, to succeed uniformly in the operation, it is desirable to treat the ox-gall in a state of decomposition with acetic acid, so as to remove all the fatty acid matter that it contains.

Before applying the solution on the glass plate it should be filtered, and may be used either in a horizontal tray, as before described at page 605 of the last volume of THE BRITISH JOURNAL OF PHOTOGRAPHY; or, if the operator prefer to pour on the solution like collodion, it will be necessary, in preparing the solution, to reduce by 125 c.c. the water in which the alum is dissolved, and to add instead, when the mixture is made and otherwise ready, 125 c.c. of pure wood spirit or spirits of wine at 36°

The glass plates, when covered, should be dried upon a grooved drying-stand, which may be placed before a fire until desiccation takes place, and without any other preparation the substratum from the moment it is dry is insoluble either in cold or warm water. In this manner any number of glass plates may be prepared in advance, and, when dry, kept, until required for use, in grooved plate-boxes, being thus protected from dust.

This substratum has the remarkable property of holding by adherence under water the exposed bichromated carbon paper, and of retaining the image during the whole time of development with warm or even boiling water; and after the application of the transfer paper and desiccation the separation of the image from the glass is always easy and complete.

M. Lamy still finds the best mode of developing to be as follows:—Take one of the coated glass plates and place in horizontally upon levelling screws; pour upon it a slight stream of water, so that it covers the whole and remains as a pool thereon. The exposed carbon paper is softened in a water tray, and the moment it becomes flat is to be applied, carbon side downwards, upon the pool of water upon the plate; the upper corners of the glass plate and the carbon paper being now pressed together between the fore-fingers and the thumbs, are then raised vertically, the water runs off, and the paper becomes attached to the coating upon the glass without any air-bubbles intervening. Then slightly squeegee and place the glass with the image underneath upon a flat surface, interposing two thicknesses of blotting-paper; after the lapse of fifteen minutes the development may be proceeded with.

The prepared coating as above described will not serve to retain indefinitely the carbon image of portraits or views which are destined to rest upon glass as a permanent support. It is to be feared that the pellicular image would detach itself sooner or later; consequently, for stereoscopic views, lantern slides, transparencies, and windows, the solution must be modified as follows:—The preceding solution, 500 c.c.; solution of well-beaten albumen, one egg in 100 c.c. of water (allowed to settle and decanted).

Up to the present moment M. Lamy has not had leisure to dry the precipitated fatty matter of ox-gall, so as to establish by weight a more precise formula.

M. Darlot has manufactured what he calls a new rapid hemispheric lens, eighty-one millemetres, or three and three-sixteenths of an inch, in diameter, for portraits and landscapes, which, having a much greater depth of focus. replaces the old six inches lens. The tubes by a revolving motion cause the anterior and posterior lens to approach each other when the operator wishes to obtain a bust, and separates them apart when a full-length portrait is to be produced. For landscapes the same lens covers without the least distortion a plate of $28\frac{5}{8} \times 19\frac{1}{4}$ inches.

A New Acid: Persulphuric Acid.—Persons familiarised with chemical nomenclature know that sulphuric acid is a composition of sulphur the most rich in oxygen gas. Its formula is expressed by $S\,O_3$ one equivalent of sulphur for three of oxygen. M. Berthelot has made known to the Academy of Sciences that he has found a compound of sulphur more rich still in oxygen—an acid which he calls "persulpuric acid," of which the formula is S_2 O7, which is two equivalents of sulphur so seven of oxygen. M. Berthelot has obtained this new acid in submitting sulphurous acid to the influence of an electric emanation.

It is announced that M. Bardoux, Minister of Public Instruction, has the intention of shortly presenting to the Chamber a project of law relative to the establishment, in the old palace of Meudon, of a physical observatory, where will be erected a telescope of very great power. M. Janssen, the director of the present observatory, who is now obliged to camp in wooden barracks and under tents, will take possession of the chateau when newly restored. The projected restoration is very ingenious. The two wings of the first story, which were nearly destroyed during the troubles of 1870-71, will be taken down, whilst the *façade* of the middle part will be retained, so that at an expense of £6,800 only will be restored the outside architectural character of this fine monument, whilst the interior will be appropriated to the requirements of the new observatory. The grand telescope, the objective or lens of which will be from $25\frac{1}{2}$ to $26\frac{3}{8}$ inches in diameter, will, it is said, cost £10,000.

One of my friends, just returned from a tour, informs me of the mania of some of the inhabitants of a small town and its environs, not fifty miles from Paris, where a new photographer has recently installed himself, and to attract attention has placed in his glass-case exposed outside his place of business, so as to tickle the palate of the curious, a model portrait *carte* of a gentleman decapitated, and suspended from one of his hands by the hair of his head is seen what should be the seat of his intelligence—his "face divine." This model appears to have brought fortune to the adept in the black art! No fewer than six hundred persons have had the questionable taste to have their portrait taken after this model, a series of changes being rung, such as the husband holding the head of his better half, and the better half shaking with evident delight the head of her lord and master! O! married woman thou hast much to answer for! The *modus operandi* is facilitated by the use of the camera described by me in the pages of this Journal some thirteen years ago, and which has two interior half-shutters, each opening from the middle vertically on pivots between the lens and the sensitive plate. During the exposure one half-shutter conceals half the glass, while the other half is open for the impression of one of the poses, the shadow of the alternate shutters concealing the joint between the two pictures. The most amusing *carte* I have yet seen is a side full-length double view of the same person standing up or sitting down on one side of the picture, showing by facial contortions his sufferings, from the head-rest being clumsily applied by the selfsame individual, who, occupying the remaining half of the *carte*, laughs at his counterpart's pain, caused by his unskilfulness. W. Harrison.

Asnierès (Seine), Paris.

THE GELATINE PROCESS.

To the Editors.

Gentlemen,—Since writing my paper on a new application of gelatine to photographic purposes, I have had sufficient further opportunity for testing the matter to enable me to cancel what I have there said as to the incompleteness of the process, and to assure gelatine workers of its entire success. I have further ascertained that, although the several samples of ox-gall which I had used in the experiments upon which my paper was based were deserving of the epithet of "noisome," the liquid itself, when really fresh, is entirely free from objectionable odour.

My butcher assured me he was supplying me with gall from a newly-killed ox; whereas he was, in fact, favouring me with specimens in an advanced stage of decomposition. Thus, then, this objection to the process vanishes, and there is no need for photographers to depend upon manufacturers for their supply of transfer gelatine. We can make it for ourselves cheaply and effectively, and without the unutterable annoyance to which I myself was subject in my preliminary experiments.

I think it will prove advantageous to diminish the quantity of gall, and to use a few grains of chrome alum with each ounce of gelatine. This will prevent undue expansion of the film, and tend to reduce the yellowness of the resulting negative. I believe, too, that the use of chrome alum, or of bichromate of potash, will enable those who prefer collodio-bromide emulsion processes to employ these home-made sheets with success.

I wish, however, to point out a few of the advantages of the use of sensitive gelatines, and thus to stimulate those who are preparing for the coming season to make a trial of my latest improvement in the gelatine process.

In the first place, nothing can be more simple than the mode of procedure from beginning to end. There can be no such thing as failure to those who have learnt to coat a plate with collodion, can make a gelatine emulsion or dissolve Kennett's pellicle, and are willing to follow the directions I have given. The only difficulty I have met with is readily avoided by the use of a suitable cup for the gelatine. The best vessel that I have used for the purpose is the cup of a child's food-warmer. The lip of this and the slope of the sides enable the operator to pour the gelatine in close proximity to the plate, and thus bubbles are avoided. It is necessary, however, to examine the plate carefully before the film has set; and then if the presence of a bubble be detected it may be at once removed with the point of a knife. I have found that the addition of a few grains of sugar per ounce greatly facilitates and hastens the drying.

In the next place, a gross of quarter-plate sensitive films can be carried with ease in the coat pocket; and I find that the weight of two dozen of them is about equal to that of one glass plate of the same size and of medium thickness. Here is an unmistakable advantage to a photographic tourist, and one which cannot fail to be appreciated by those who have to climb an Alpine pass or peak, and desire to be independent of guides and porters.

And then, further, my gelatines differ from other forms of sensitive tissue—not only in the fact that the process of making them is so simple that the merest tyro may make them for himself, but also that they are rigid. This quality gives the tourist photographer a yet further advantage in that he will be able, if he please, to abolish very much of the heavy timber of his camera and double dark slide of wood, and adopt, instead of the latter, a simple pasteboard slide.

I am employing some of my leisure time in devising a form of cardboard dark slide to carry my new films, which, in combination with Mr. Woodbury's scenograph, will reduce the *impedimenta* of the photographic tourist to the very minimum of bulk and weight.—I am, yours, &c.,

Wallasey, February 11, 1878. H. J. Palmer, M.A.

BALLOON PHOTOGRAPHY.

To the Editors.

Gentlemen,—Since writing my communication last week, under the head of *Balloon Photography*, I have received letters from Mr. Warnerke and also from a friend in St. Petersburgh, to whom I had written on the subject. Both these communications tend entirely to exonerate Mr. Warnerke from the imputation which anyone would have gathered from the letter of Dr. Vogel, which had already appeared in several journals, and which must have been the result of some misunderstanding on his part.—I am, yours, &c., Walter B. Woodbury.

Manor House, South Norwood, February 11, 1878.

THE FERROUS OXALATE DEVELOPER.

To the Editors.

Gentlemen,—We have much pleasure in giving our testimony to the value of the ferrous oxalate developer for dry plates, given to the world through your columns by Mr. W. Willis, Jun.

Being very rapid and energetic in its action when employed at full strength, we deem it well to caution those who employ it for the first time to wash the plate with more than usual care after moistening with methylated spirit, or markings and uneven development will be the result. According to our comparative trials with it up to the present time its power is greater than that of carbonate of ammonia in saturated solution or of liquor ammonia of *usable* strength; and one of its best features is almost a total absence of any tendency to cause fog.

We have just received from Mr. William Cobb, of Woolwich, prints from negatives taken professionally in the studio with our "B" washed emulsion developed with ferrous oxalate, and which were better exposed than wet plates which had the same time given them. The quality, you will observe from the enclosed, is all that can be desired.

We hope the new developer will have a fair trial from all who take an interest in dry-plate photography.—We are, yours, &c.,

February 11, 1878. Wratten and Wainwright.

IMPROVEMENTS IN CARBON PRINTING.

To the Editors.

Gentlemen,—Permit me, thrfugh your columns, to assure the gentlemen of the Autotype Company that they have as completely misunderstood the spirit and tenor of my last letter as they have those of my article in your Almanac. In neither is there a word to disparage themselves, their accuracy of statement, or their productions. Their error arises from the misconception of the somewhat dubious term "recent period," which they persist as understanding to mean "present time." A simple perusal of my article will prove that this was not my meaning, inasmuch as I give authority for my statement by quoting, or endeavouring to quote, the fifth edition of their *Manual*, and the authority cannot extend beyond the time at which the words quoted were written.

Permit me again, in spite of the repetition, to state in more precise terms the only propositions affecting the Company in that article, and my object in writing it. We are all emulous of doing our best to render the autotype process more perfect and practicable.

Having seen weekly announcements of the Autotype Company's progress in permanent tissue-making I was desirous of putting on record the result of my own labours during the past year in the same direction; hence the article which has given such unreasonable offence. I said, or would have said had the *Manual* quoted been before me:—

1. Up to a recent period, certain desirable colours could not be obtained in pigment paper without the use of cochineal—a more or less fugitive colour. This is admitted and recorded in one of the later editions of the *Manual* of the autotype process, 5th edit., p. 82.

2. I have succeeded in solving this problem by the use of alizarine combined with alumina and some other base not affecting the solubility of gelatine.

Where is the offence? The only possible way in which the Company can be affected by my claims is that the process which I have patented should have proved to be identical with that which they employ; in which case I should still have claimed priority, inasmuch as a secret use of any process is not received in evidence either in a court of law on a question of patent right, or in a court of honour as a question of priority of discovery or invention, prior publication being universally received as the test of priority of discovery.

But this point has been set at rest by the editor of the *Manual*, who states that my patent may be good when I have disclaimed Wenderoth's process; our processes are, therefore, not identical.

Trusting that the explanations I have given will be satisfactory to all aggrieved—I am, yours, &c., J. R. Johnson.

February 12, 1878.

Photography in Court.—*Photographers and Celebrities: The London Stereoscopic and Photographic Company* v. *Stanton.*—This case was heard on Friday last, the 8th inst., at the City of London Court, before Mr. Commissioner Kerr. It was a claim for £5 for work done. The defendant pleaded never indebted. Mr. Weatherfield appeared for the plaintiffs, and called Charles Hunt, in the service of the complainants, who stated that the defendant ordered 187 photographs of himself in professional costume, as the champion bicyclist. The photographs were duly delivered, and afterwards witness applied to the defendant for payment, who promised to call at the complainant's office in Cheapside and pay for them. At the same time he said he had only received 150, and the value of that number was now claimed. Stanton, who appeared in person, denied giving the order. He said Mr. Walker, the agent of the company at the Alexandra Palace, called on him, and asked him to sit for his photograph. He complied with the request, and sat in seven different positions, the understanding being that he was to have a monetary advantage therefrom.—The Commissioner: In what way are you a celebrity? Stanton: I am the champion bicyclist, your honour.—The Commissioner: You say you were called on to sit for your photograph as a bicyclist? Stanton: Yes, your honour. They came after me several times, and it was understood that I was to have something for my sitting.—Mr. Weatherfield said it was usual for the company to give celebrities a dozen *cartes* for themselves. In this case the defendant had been allowed thirty-seven.—Stanton: Do you think I was going to let the company sell my photograph all over the world for a paltry gift of thirty-seven to me? What is the worth of such a number to me? (Laughter).—The Commissioner said there was a flat contradiction on both sides, and it was a case that he thought a jury had better decide. He should adjourn it for that purpose to a future day.—Stanton said he was under articles to ride his 1,000 miles race, and asked that in consequence the case should not come on before March 2nd.—The learned Commissioner complied with the request, and ordered the case to be adjourned till some day after that date.——*Assaulting a Wife.*—Henry Poole, a photographer, of 775, Commercial-road, was brought before Mr. De Rutzen, at the Thames police court, on Wednesday, the 6th inst., charged with committing a violent and unprovoked assault on Mary Poole, his wife.—Mr. W. Moore, the prosecuting officer of the Associate Institute for Improving and Enforcing the Law for the Protection of Women, watched the case; Mr. May, solicitor, appeared for the prisoner.—The complainant, who had a severe cut on the side of her nose, proved that defendant struck her a violent blow on the side of her nose, and rendered her nearly insensible. She lost a great deal of blood, and could not stop the bleeding for two hours. Defendant was sentenced to two months' hard labour.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

For exchange, a pair of dissolving-view lanterns, with oil lamps and three-inch condensers, in neat box. What offers? Want a small portable camera and stand for dry plates.—Address, F. M. S., 30A, Flowergate, Whitby.

Portable glass-house, 22 × 10 feet, and tent, 11 × 18 feet, covered with unbleached calico, offered in exchange for bellows camera and doublet lens; also, glass-house on wheels.—Address, F. Hamblen, Dobwalls, Liskeard, Cornwall.

Landscape background, by Claudet and Houghton, 8 × 7 feet, cost 37s. 6d., never been used; How's tent and tripod stand, in good condition, but stained, cost £6; in exchange for useful studio accessories. Photographs exchanged.—Address, Geo. Avery, Tonbridge.

$7\frac{1}{4} \times 4\frac{1}{2}$ landscape camera with swing back, wet slide, and changing box; changing box for stereo. size, Smartt's dark tent, opal printing-frame, magic lantern by Dancer, Malden dissolving tap, Fletcher's aspirator, Fletcher's large-size foot blower, Gore's gas furnace, pair lantern objectives (portrait combinations), and lead hydrogen generator. All or any of the above apparatus will be exchanged for scientific apparatus, &c.—Address, W. J. Chadwick, Moss Side, Manchester.

ANSWERS TO CORRESPONDENTS.

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

Lieut. Lysaght.—Thanks. In our next.

J. Cowell.—Received. Thanks. In our next.

Newnham.—The gentleman you name is not now a manufacturer of photographic lenses.

B. L. L.—By a ten-per-cent bath is meant one containing one part of silver to ten parts of water.

T. S.—Unless a special agreement has been made to the contrary the negatives must be held to be your own property.

Historicus.—You are mistaken; we have invariably recognised the right of inventors to secure their inventions by patent.

XYZ.—The process must be looked upon with great suspicion. Its results are not at all permanent—a fact of which we have had but too good proof.

Old Reader.—If your architect will put himself to a little trouble in studying the light required for a studio he will soon be able to set matters right.

Alpha.—By using a much weaker solution of tannin softer effects will be obtained. Try a solution containing not more than six or eight grains to the ounce.

Boomerang.—Try the effect of making the toning bath with six grains of sulphocyanide of ammonium to one grain of chloride of gold. This quantity will suffice for four or five ounces of water.

T. C.—A "drop" is a very unsatisfactory degree of measurement, for drops vary according to the nature of the liquid. The terms *minim* and *drachm* are definite and satisfactory, and ought to be employed by you.

Veritas.—We shall look into the matter. It is a question upon which, from the practitioner's point of view, we are not likely to be much enlightened by appealing to practical operators, as we are not aware of any who now employ the process.

W. E. C.—This correspondent asks if any reader of this Journal will inform him what is the *best* book on landscape photography that has been published. For our own part we are not aware of any book that is specially devoted to that subject.

J. Wilson.—Seeing there are so many methods by which opalotypes can be produced, it is quite impossible for us to answer your question—"How are opalotypes made?" To give a general answer: they are made by means of wet collodion, dry collodion, silver printing, and carbon printing.

Jas. Scott.—Try the method, described in our Almanac for the present year, of first producing a large transparency the demensions of the desired enlargement, working upon it with a pencil, and from it obtaining, by superposition, a negative to be employed in printing the enlargements direct.

Chemicus.—It is probable that the phantom image that has appeared on your plate is owing to your having made use of an old plate from which the former picture had not been thoroughly removed. By cleaning the glass thoroughly and making use of a substratum you will no more be troubled with such ghostly figures.

Bristoliensis.—While a French-made camera will answer the purpose, it will not give such an amount of satisfaction as one of English manufacture; and for this reason we cannot advise you to make the contemplated purchase. There are several branches of manufacture in which the French greatly excel, but we cannot in that category include either cameras or lenses. In these our English makers stand unrivalled.

A. Bennett.—Your proposed plan is good. As it stands at present the feet of a standing figure might be rather imperfectly illuminated, but this can easily be obviated by making use of a small platform about twelve inches in height. Twenty-one ounce glass will be quite strong enough. Common Belgian sheet will answer well, and is moderate in price.

T. Nicholls.—Mr. Breese was a photographer—half amateur, half professional—in Birmingham for a considerable period, but a few years before his death he removed to Sydenham, near London. As you will see from what has been published with respect to his photographic works during the past three or four weeks, his *spécialité* lay in stereoscopic transparencies.

Pyro.—The work is most excellent considering the short time which has elapsed since you first commenced to practice photography; but you have much to learn yet ere you become qualified to take portraits professionally. We advise you to pay a premium to some photographer in good practice, and secure the advantage of a few months' constant employment in the studio.

L. S. D.—It is quite true that the focus of a lens is an uncertain quantity, as it depends upon the distance at which the object to be depicted is situated from the lens. When "focus" is spoken of the object is understood to be at a great distance—as the sun, for example. But it would needlessly encumber our phraseology if this were to be explained every time one spoke of the focus of a lens; hence the *solar* focus is always understood. When the object to be reproduced is situated within a short distance—say a few feet—of the lens, the relation of the object to the lens, on the one hand, and the lens to the ground glass, on the other, is known as the conjugate focus.

A Member wishes to be informed by what kind of objective Mr. Viles took the large microphotographs with respect to which he made some observations at the meeting of the Photographic Society of Great Britain on Tuesday evening last. We reply: Mr. Viles, as was stated in his paper read at the January meeting, makes use of the ordinary microscopic objective, the chemical focus of which is previously made to coincide with its visual focus by means of a double-convex lens of low power (a spectacle glass being usually employed for this purpose) placed at the posterior end of the objeetive. The precise strength of glass required for this special purpose can only be ascertained by experiment, as the same corrector will not necessarily answer for two objectives of precisely similar focus. If you have access to former issues of The British Journal Photographic Almanac you will find articles devoted to this special subject.

LONDON GAZETTE, *Tuesday, February* 12, 1878.

Public Examination.

February 25.—E. Williams and W. Singer Suoden, Exeter, photographers.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For the Week ending February 13, 1878.

These Observations are Taken at 8.30 a.m.

Feb.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
7	30·62	N	33	35	41	33	Dull
8	30·65	SW	—	30	36	27	Foggy
9	30·43	SW	34	34	36	28	Dull
11	29·95	NE	38	40	45	33	Dull
12	30·26	E	37	39	48	36	Dull
13	29·95	SE	47	48	54	36	Dull

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 929. Vol. XXV.—FEBRUARY 22, 1878.

ON THE ACTION OF OXIDISING AGENTS UPON THE UNDEVELOPED IMAGE.

In the course of our experiments with the various agents mentioned by Captain Abney as capable of destroying the latent (or undeveloped) image upon bromide of silver films we have partly gone over the ground suggested last week by Mr. Herbert B. Berkeley, inasmuch as we have examined the action of those substances upon the *visible* image produced by prolonged exposure to light. The general result tends to prove that the difference between the visible and invisible images is merely one of degree, and not, as it has been supposed by some, the issue of distinct reactions; but, though the various agents act uniformly in destroying the latent image, we have found so wide a difference in their behaviour in other respects as to raise a doubt in our mind as to whether the effect is identical in each case; that is to say, whether the removal of the image is really performed by virtue of the power of oxidation.

Before proceeding further we may allude to something we have already written (*ante*, page 47) with regard to the action of potassic bichromate. It will be remembered that we sought to utilise that salt as a fog-remover in an emulsion containing free silver, but that it rendered the latter absolutely insensitive, notwithstanding that when applied to an unexposed film it exhibited no such desensitising effect if washed off previous to exposure. In searching for the explanation of this anomaly we have, we believe, succeeded in tracing it to an unsuspected source—the employment of cadmium bromide in the decomposition of the chromate of silver. This would result in the formation *in the emulsion* of insoluble chromate of cadmium, which is the cause of the loss of sensitiveness. Solutions of bichromate of potash and bromide of cadmium may be mixed without suffering decomposition; but if oxide of cadmium be treated with solution of potassic bichromate an equivalent of chromic acid goes to the cadmium, forming a yellow precipitate of chromate of that metal, and leaving chromate of potash in solution.

If, now, we add a few drops of the bichromate solution to an emulsion containing excess of cadmium bromide no decomposition ensues, and all traces of the bichromate may be removed by washing; but if we add sufficient silver nitrate to decompose the free bromide and leave a slight excess we shall have chromate of silver formed. If the latter be now decomposed by cadmium bromide the chromic acid goes to the cadmium, and we thus obtain an emulsion indistinguishable as regards colour and general appearance from an ordinary one, but containing chromic acid in an insoluble form, and, therefore, incapable of removal by washing. The *rationale* of the desensitising action of this substance in emulsion is not very clear; but we may suggest that two atoms of bromine liberated by the action of light from four atoms of silver bromide (assuming the sub-bromide theory of the formation of the latent image) combine with the cadmium, setting free the chromic acid and oxygen. The latter then seizes the two loose atoms of silver of the sub-bromide, forming oxide of silver, which in turn is decomposed by the chromic acid with formation of silver chromate, the chromic acid eventually going back to the cadmium by direct decomposition, thus:—

$$\begin{aligned} 2\,Ag_2\,Br \times 2\,Br \times Cd\,Cr\,O_4 &= 2\,Ag_2\,Br + Cd\,Br_2 + Cr\,O_3 + O. \\ &= 2\,Ag\,Br + Ag_2\,O + Cd\,Br_2 + Cr\,O_3. \\ &= 2\,Ag\,Br + Ag_2\,Cr\,O_4 + Cd\,Br_2. \\ &= 4\,Ag\,Br + Cd\,Cr\,O_4. \end{aligned}$$

That free bromine is capable of decomposing cadmium chromate we have satisfied ourselves by experiment; but such calculations as the above still leave open the question as to why the liberated bromine should show greater activity in combining with foreign matter than with the loose atom of silver of the compound from which it has been ejected. This, indeed, forms the chief obstacle in the way of our complete acceptance of the sub-bromide theory, and we can only assume that the foreign matter acts by a species of catalysis. It will be noticed in the above equation—and the same may be said if the potassium bichromate be substituted for the cadmium salt—that the chromic salt suffers no permanent change; and this fact, if taken in connection with other circumstances and with the behaviour of potassic permanganate, tends rather to support the sub-bromide theory than otherwise.

Recognising the possibility that the latent image and the visible impression produced by prolonged exposure to light might be caused by different reactions, and taking it as an accepted fact that the colouration produced in the latter case arises from the formation of sub-bromide, we undertook the examination of the various changes brought about by oxidising agents upon emulsions and films thoroughly reduced by exposure. Our first experiments were made with an emulsion in which the reducing action of light had been carried to the fullest possible extent. It was precipitated in the presence of a slight excess of soluble bromide, washed, and dried, the resulting powder brought to a state of extreme fineness and exposed to full daylight for several hours, precautions being taken to bring every portion of it under the light's action. When uniformly darkened to a dull slate colour it was re-emulsified, when, as the normal yellow colour partially returned, the emulsion was again exposed to light until, upon thorough shaking, no alteration in its appearance was noticeable.

It is well known that when an ordinary emulsion is exposed to daylight for a sufficient length of time to discolour it a vigorous shaking almost entirely removes the discolouration; and, except in the presence of excess of silver, it is almost impossible to produce a permanent reduction throughout the whole body of the emulsion. The outer portions only appear to be reduced, and when shaken up again it would appear that the ejected bromine rapidly recombines with the loose atom of silver, removing the discolouration. In the case of the emulsion we have spoken of above it may be remarked that a comparatively brief exposure sufficed to produce the maximum of discolouration, and, that point attained, there seemed to be no tendency to go back to the normal shade. We mention this because it may possibly explain the discrepancies between the behaviour of the emulsion and the exposed films of which we have to speak; in point of fact it appears more than probable that, during the several hours' exposure to light which the dried emulsion underwent, the bromine was not only *disengaged* but actually dissipated, and thus the final emulsion, being deficient in bromine, was incapable of resuming its original state under the action of the various oxidising agents. Contemporaneously with the preparation of this emulsion we exposed another containing free silver until it ceased to change colour upon shaking. In this case the change was rapid, occupying only about a couple of hours.

Each of these emulsions was then divided into two parts, which were treated respectively with potassic bichromate and potassic permanganate in saturated solution. Ten drops of each solution in one ounce of emulsion (dropped from a glass rod) were added—as large a quantity as the emulsion would conveniently bear. In the case of the first-named, or neutral emulsion, no immediate change was evident with either reagent; but the other produced with potassic bichromate the deep red colouration of chromate of silver, and with the permanganate a dirty brown. A solution of bromide of ammonium in weak alcohol was then added to the emulsion containing chromate of silver until the red colour was removed, and an equal number of drops were also added to the permanganate sample. Here the first difference was noticed. The portion treated with bichromate assumed, after the neutralisation with bromide, the ordinary slaty colour produced by exposure to light, while the other exhibited a yellowish-drab shade; beyond this there was no further change apparent for several days.

After standing more than a week the two portions of neutral emulsion were quite unchanged in colour. We then added to each two grains of ammonium bromide in crystals, shaking well until solution was effected; still no change occurred, but after standing undisturbed for about an hour a distinct difference was noticeable in the colour of the two samples, the bichromated one having become lighter. After three or four days the maximum change appeared to have taken place, and the colour became stationary, the portion treated with bichromate exhibiting a yellow colour—not the pure shade of an ordinary emulsion, but a greyish-buff tinge—the other a yellowish brown. The two remaining samples, after standing about a week, deposited the whole of the suspended matter, the clear liquid in the case of bichromate being steel-blue, and in that of permanganate rich brown. The deposit in the one case was of a dirty green shade, in the other yellowish or drab, and when shaken up the same colours remained.

It is needless to say that none of the four samples are in workable condition, nor do they offer any probability of ever being so; the action of the oxidising agents upon the organic matter of the collodion appears to mask any other effects, while the severity of the mode of preparation would seem to be too great. The green colour mentioned in connection with one of the samples would point to the formation of one of the oxides of chromium, while the yellowish-brown colouration exhibited by both the samples treated with potassic permanganate arises no doubt from oxide of manganese, and probably sub-iodide of silver.

The emulsion experiments having for our purpose proved fruitless we next turned our attention to films thoroughly reduced by exposure to light. In addition to the two oxidisers already spoken of we employed dilute nitric acid also (equal parts of acid and water). The plates, after exposure to bright daylight for five minutes, were immersed in the different solutions; but by this method we found it difficult to judge, in the yellow light of the developing room, whether any change had taken place, except in the case of nitric acid, which had produced a distinct alteration in colour. We next placed an exposed plate upon a levelling-stand and dropped upon it a few drops of each of the reagents, so as to form three small pools in close proximity for convenience of comparison. The oxidisers were left to act for five minutes; the plate was then inclined and the solutions allowed to run off, and a stream of water from the tap directed upon the film in such a manner as to wash off the surplus without allowing the different agents to commingle. After allowing the plate to soak for two or three minutes, in order to remove any traces of the bichromate and permanganate, the film was examined. By reflected light the portions which had been acted upon by the oxidisers were plainly visible. Nitric acid had apparently *almost* removed the discolouration, the other two had produced a change; but whether it was a partial removal of the sub-bromide or an alteration in the colour of the film it was impossible to tell. By transmitted light, however, the mark left by the permanganate appeared considerably denser than the remaining portions of the plate, while the bichromate had left a faint trace of the same description. After treating the film with hyposulphite of soda the permanganate stain remained distinctly visible as a greyish-brown deposit, the rest of the plate being quite clear.

Now, here was very strong evidence not only of oxidation of some sort, but of a very distinct difference in the action of potassic permanganate as compared with the other reagents. In order to test whether the oxidation was performed solely at the expense of the sub-bromide we treated an *unexposed* film with bichromate and permanganate. After a thorough washing a distinct brown stain remained from the latter, but no trace appeared of the action of the bichromate. The permanganate stain remained after treatment with hypo., but not so well marked as upon the exposed plate. We next treated a *plain* collodion film with permanganate, and the result was a faint transparent brownish stain entirely different from that produced upon a film containing silver bromide. It would appear from this that the permanganate acts not only upon the sub-bromide but also upon the pyroxyline and *the organic silver compound* contained in the emulsion; the bichromate is apparently free from the two latter actions.

From this action of the permanganate upon an unexposed film it appeared not improbable that it should exert an important influence upon the sensitiveness of the film so treated. Accordingly we prepared a plate, washed it, flooded it with permanganate, again washed thoroughly, and dried without organifier. Exposed under a transparency it gave *not the slightest trace of an image.* Another plate was prepared, one end being treated with bichromate and the other with permanganate, the middle portion remaining untouched. Exposed for half as long again as we judged necessary for the centre of the plate, that portion and the bichromated end showed not the slightest difference in result, while the permanganate end remained blank. The development was continued until the picture became almost buried; but the only result upon the part of the film treated with permanganate was a uniform reduction (or fog) without a trace of an image.

It only remains to be said that these experiments were performed with saturated solutions; when the strength was considerably reduced the effects produced were similar but less marked. As a destroyer of the latent image the permanganate is much more powerful than the bichromate, and must, therefore, be used more sparingly.

We may observe, in conclusion, that these results do not in any way clash with those of Captain Abney, as that gentleman employed very weak solutions while we have worked with strong ones. The deductions we arrive at are that the action of potassic permanganate differs entirely from that of nitric acid or potassic bichromate. The two latter, we think, oxidise *temporarily* the loose atom of silver of the sub-bromide, and bring it within the influence of another power, while in the case of permanganate simultaneously with the action upon the sub-bromide occurs another—the oxidation of the organic constituents of the film. It seems to us that any agent which produces a permanent alteration in the composition of the sensitive film is unsuitable for use as a fog-remover.

THE PROGRESS OF PHOTOCHROMIE.

It is always interesting to note the progressive development of a process—to observe its gradual growth from inception to completion, if indeed it be safe to apply such a term to anything in connection with photography. This is in a peculiar degree the case with the photochromic process of M. Leon Vidal, which we have watched with friendly interest ever since a few crude specimens of the then undeveloped process were placed in our hands several years ago for the purpose of being exhibited at the Bradford meeting of the British Association. These specimens consisted of a number of transparent pellicles each containing a small portion, in one colour, of a picture, or, more correctly, all the portions of the picture that had to be produced in one colour. On one pellicle were all the reds, upon another the blues, and so with the yellows, the flesh tints, and soforth. The finished picture was composed of these pellicles set off in rotation upon white paper.

This method of building up a picture in colours was exceedingly troublesome and necessarily expensive; and it was felt by many that the ingenuity demanded far exceeded the chances of the process being matured into a practical industry. Since that time, however, M. Vidal has effected a complete change in his method of producing photochromes, and their manufacture, if such a term be applicable to works of art, is now being proceeded with commercially.

Having being apprised by M. Vidal that he had established an agency at 33, Southampton street, Strand, we lost no time in calling upon M. Vidal's representative, Mr. Hore, who has on exhibition at the address indicated a collection of photochromes so choice as to elicit expressions of unqualified admiration from all who have seen them.

If we correctly apprehend the method by which these pictures are now produced, it is as follows:—As many negatives are taken as there are colours in the subject to be reproduced in photochromie. From each negative is stopped out, by means of opaque varnish, every part except that which is required to be a certain colour, such as neutral, green, red, blue, or yellow, each negative representing only one of these or other colours. Lichtdruck plates are now prepared, one from each of such negatives; and as each plate is capable of printing its own special colour with all the delicate gradations of tone, from the faintest manifestation to the most intense rendering, very charming and natural effects may be obtained. The picture which is being printed receives an impression, in turn, from each of these collographic-printing surfaces, and when it has passed the last of these every portion of the subject will have been impressed.

Chromolithography is naturally suggested by this mode of proceeding; but this kind of photochromie differs from chromolithography, inasmuch as, while the former possesses all the advantage secured by correctness of registration of the colours, and the production of secondary and tertiary tints by the overlapping of those represented by special negatives, it possesses the further and immense advantage that each tint possesses in itself the smoothness and graduation of a silver photograph. The technical smoothness of photographic monotone is here *plus* colour; and these colours may be of any degree of brightness or sombreness thought desirable. The truthfulness and fidelity is that of a photograph, while the brilliancy of colour and permanence are those associated with the printing inks made use of by the chromolithographic printer.

In the representation of articles in steel, silver, and gold the Vidal polychromes are marvellous. How are they produced? Our opinion is that in this department of photochromatic practice will be found at once the most effective and the simplest application of the new art. Suppose such an article as a shield, a helmet, or other piece of *repoussé* work in steel, is the subject to be represented: the ground upon which it is to be printed must be either silvered or tinned by methods known to workers in bronze powders. Upon this the design is printed, collographically, in monotone, the background obliterated by opaque ink, and the thing is at once done. An imprint of a transparent yellow or "aurine" colour upon this converts any desired portions of it into gold or brass, as the case may be.

By stating that such effects may be produced easily we are so far from detracting from the merits of the process that we thus bestow upon it the highest commendation in our power. In order to demonstrate how very successfully the process is carried out we may refer to the shield of Henri II., in steel, and to the casque of the same monarch, which bear examination through a magnifying-glass without dispelling the charm of the first impression. The royal sceptre of Charlemagne is in gold, and contains a fine display of precious stones, for the representation of which M. Vidal's system of polychromie seems to offer peculiar advantages.

Examples of this class of work have already been exhibited at meetings of both the London photographic societies; and we are assured by the agents of the society under whose auspices they are published in this country that they will have pleasure in exhibiting them to all who choose to call for that purpose at the address given in a previous portion of this article. Societies in provincial cities and towns are already aware that every facility is afforded to them for examining these the latest novelties in the art-department of photography.

RECTIFYING THE BATH.

We have lately, in treating upon the use of the double bath for dipping plates, stated that it is quite possible to work a bath down till it is almost all used without any necessity for tampering with it in any way, either strengthening or sunning, except an occasional pouring in a large dish to get rid of alcohol and ether. We still adhere to this principle of practice; yet, of course, we know that through accident, carelessness, long disuse, and a variety of causes, it is quite possible for the bath to get disordered and require rectification in some manner. To accomplish this—which means, in effect, to get rid of some obnoxious substance—there are three courses open:—First, to dissipate easily volatile matter by means of spontaneous evaporation; secondly, by means of boiling to rid the silver of a portion of the water and most of the alcohol and ether; and, finally, by means of sunning to precipitate nearly all foreign matter, volatile or solid, by precipitation.

In nine cases out of ten where boiling and sunning are resorted to we are assured that simple laying aside for a day or two in a clean shallow dish will answer all purposes, due precautions being taken to prevent the access of dust. When a bath streaks and stains the plate in the direction of the dipping or the draining the irregular marbled appearance does not necessarily signify that the bath is chemically wrong; it merely indicates that, through what might be termed the "mechanical action" set up through the fluids of different densities—the ether and the ether-saturated bath—not thoroughly mixing, and also through the surface tension being too rapidly and irregularly altered, the deposit of silver takes place unevenly when the mixing is incomplete, or when, through evaporation, the surface tension is brought to an abnormally unequal state. A plate prepared in an old bath, placed in the dark slide for a minute, and then developed after a moment's exposure to the open window of the dark room, will show streaks, stains, and mottling, but rarely fog; yet, if developed immediately upon removal from the bath after a similar exposure to light, it would be almost, if not quite, as clean as a plate prepared in a new bath. A bath so out of order we should term "mechanically deranged"—a state quite different from that which will not allow of a picture being taken under any circumstance without both fog and stains. Such a bath we should term "chemically wrong," and unless the exact cause were known sunning would be the treatment for it.

We have found that by leaving a bath for two days for spontaneous evaporation, in a dish large enough to admit of the solution being no greater depth than half or three-quarters of an inch, nearly the whole of the ether and alcohol will be removed—quite as much as is necessary for all practical purposes. A good portion of the water, also, will have been dissipated into the air, so that it will be quite necessary to ascertain the strength, and make up with water before using. The old method was, after calculating the amount of water required, to put it into a separate vessel and add a portion of the bath to it, and then, after filtering the precipitated iodide, to mix the two solutions together. For those who do not care to try the nitrate of baryta plan this mode of treatment is still to be recommended, there being no doubt that the precipitation of a portion of the iodide in this manner usually gets rid for a while of a tendency to pinholes, though there have often been cases where complaints have been made to us that this treatment has not succeeded.

It is to be noted that a double filter is always necessary in filtering a solution containing precipitated iodide of silver, the particles being so fine that they pass through paper of the closest texture. Even after filtration we have often found that it has been needful to add a few crystals of silver to entirely remove the opalescence.

The second mode of treatment is more troublesome, entailing the use of an expensive evaporating dish and careful attention during the process lest the evaporation proceed too far and the dish should get broken, as it is liable to do, if the bath boil till dry, unless the heat be carefully regulated. The only advantages of the boiling method are the more speedy removal of the ether and alcohol, though even after an hour's boiling they are not entirely removed. The tenacity with which volatile liquids dissolved in water cling, as it were, to it is most remarkable.

In our own experience with boiled baths we have usually found that they give hard pictures, even with a maximum of exposure, and that they also generally work slowly. We, therefore, when we have boiled a bath, have generally proceeded to sun it without any trial of its qualities. We made a series of experiments some time ago upon baths so treated, and then dialysed into pure water. We obtained not the slightest benefit by the process, much to our disappointment; for we had formed the theory that the substances giving the hard and foggy quality to the bath were likely to be among the colloids—a theory which was further rendered probable by the appearance of the liquid in the dialyser, which, when filtered, was of a deep straw colour; but, as we have already said, no benefit accrued from the use of the method.

Finally: there is the sunning, which we think is only necessary in a limited number of cases. It has been so often described that little can be added to our knowledge of the process. We may, however, remark that the end to be attained is brought about most quickly by rendering the bath decidedly alkaline by means of ammonia. We have not found it sufficient simply to neutralise, the clearing then being slow and less complete; five drops of ammonia beyond the point of neutralisation is the quantity we have usually added to half-a-gallon (or a Winchester quart) of solution when making use of the sunning process. When the light is good and the sun well out a few days will see the solution quite clear, with a thick black deposit at the bottom, no further exposure to light causing any alteration in the appearance of the liquid. The bath, then, being alkaline has to be brought to a working degree of acidity, and this has to be done *after* filtration.

With a quantity not larger even than a Winchester quart this is a very tedious process, as a thorough shaking, followed by a few minutes' rest, has to be given between each addition of acid, and testing with litmus paper, to ensure its thorough distribution. The plan we have found to save a considerable loss of time has been to keep two separate bottles of diluted nitric acid and ammonia, of such a strength that equal quantities of each exactly neutralise one another. All that is required after sunning and filtering is merely to put in as much acid solution as there was added before sunning of the ammonia solution. The amount of ammonia absorbed during the precipitation is very slight, one extra drop of acid being more than its equivalent, so that the acid solution required should be diminished to that extent.

Failing the adoption of this method, it will be found easier to take only a part of the bath—say one-fifth—and neutralise it, which will be done far more readily than if the whole quantity were so treated; the acid required to neutralise this portion being multiplied by four, gives the quantity needed for the remainder of the half-gallon.

SILVERING GLASS SURFACES.

The growing importance of reflecting surfaces for optical purposes renders it desirable that we should keep our readers well informed as to every development of the art of silvering glass. Mirrors silvered on their outer surface are, we need scarcely observe, now being extensively employed in the production of reversed negatives for various purposes in photography, the reversing prism having in most instances been superseded by the surface of silvered glass.

The method we have employed for several years is one with which (thanks to the lucid directions given by Mr. H. J. Burton in our Almanac for 1873) we have never experienced a failure. Further modifications—all tending to impart a greater degree of simplicity and certainty to the process—having been discovered by Mr. Burton, he embodied these in a second article on the subject in our Almanac for 1876. From that article we give the following extract, showing the manner of preparing and using the various solutions:—

Solution 1.—

Nitrate of silver	25 grains.
Distilled water	1 ounce.

Solution 2.—

Potash (pure)	25 grains.
Distilled water	1 ounce.

Solution A.—

Solution 1 } Solution 2 }	equal parts.
Ammonia	to *just* dissolve the precipitate.
Solution 1	to just cause a discolouration.

Solution B.—

Loaf sugar	2700 grains.
Distilled water	20 ounces.
Nitric acid	2 drachms.
Alcohol (strong)	10 ounces.
Distilled water—to make	80 ,,

For Use.—

Solution A	1 ounce.
Solution B	1 drachm.

"In preparing solution A do not be deceived at the time of adding the ammonia, as a little of the precipitate will not dissolve. If the liquid be clear sufficient has been added.

"*Precautions to be Observed in Carrying out the Process.*—Keep the solutions and dishes always in a warm room, or the deposit will be thin and black, instead of stout and bright. Dust the mirror after cleaning, and also the dish before pouring in the solution, or there will be a quantity of pinholes. Well mix the solutions before using, or the surface of the mirror may be mottled. Remove the mirror from the dish as soon as all the silver is deposited, or a bleaching action will commence. It may be known when the silver is all down by gently removing a little of the scum from off the surface of the liquid with a piece of paper and observing if the solution be clear; if so, the deposition has ended. Upon its removal from the dish the mirror must be well washed and dried off quickly upon blotting-paper, and finally warmed to about the same temperature as a negative that is about to be varnished with spirit varnish; and while still warm it should be polished. A little care is necessary when the polishing is commenced, and three soft and dry wash-leather pads should be made, kept separate, and marked Nos. 1, 2, and 3. No. 2 can be charged with the finest rouge, and beaten out again; the other two require no further treatment. Gently pass pad No. 1 in circular strokes over the newly-silvered mirror for five minutes, then pad No. 2, till properly polished, and finish off with pad No. 3. Keep the pads in tin boxes, and quite dry.

"While a mirror is in use it requires to be frequently polished—say twice a week. Never let it get tarnished. Use the pads in the order as given above, and do not forget to warm the mirror before using the pads. Keep the mirror covered up when not in actual use."

As respects the keeping properties of these solutions Mr. Burton finds that A is subject to a slow decomposition, the silver being deposited upon the sides and bottom of the bottle. On this account he prefers keeping the potash and the silver in two separate solutions. With regard to the other he says:—

"Solution B, on the contrary, certainly improves by keeping. I am using some that is seven months old, and it works admirably. In using grape sugar as the reducing agent I have succeeded very well; but it is not so certain as my solution B, nor does it keep so well in solution.

At the last meeting of the Photographic Society of Great Britain Captain Abney referred to a process of silvering he had employed with great success, by which, using the most ordinary care, he said it was impossible not to succeed. From Captain Abney's description of his method of working, given in the last number of the *Journal of the Photographic Society*, we make the annexed extract:—

"The following is the formula given by Martin:—

No. 1.—	Silver nitrate	17·5 grains.
	Water (distilled)	1 ounce.
No. 2.—	Ammonium nitrate	26·25 grains.
	Water (distilled)	1 ounce.
No. 3.—	Caustic potash free from Cl and CO_2	4·4 grains.
	Water (distilled)	1 ounce.

No. 4.—Dissolve 44 grains of sugar in 10 ounces of distilled water, add 5·3 grains of tartaric acid, and boil for 10 minutes. Next add 2 ounces of alcohol, and add sufficient water to make up to 20 ounces if the silvering is to be done in winter, or to more if it is to be done in summer.

"The effect of tartaric acid in the sugar is to produce inverted sugar, which reduces the silver from the mixed solutions.

"In my own practice I use about 31 grains of ammonium nitrate, instead of 26·25 grains, the crystals being dried beforehand.

"The plate is cleaned with concentrated nitric acid, by the aid of cotton wool, perfectly free from all extraneous matter. It is then washed in distilled water and dried. Equal parts of No. 3 and alcohol are next applied, and whilst still wet the plate is placed in distilled water, and all the alkali rubbed off by a badger-hair brush. The plate is finally placed face downwards in distilled water, resting on a couple of *clean* strips of glass.

"To prepare the silvering solution, equal parts of Nos. 1 and 2 are mixed in one measure, and the same quantities of 3 and 4 in another. The mixture in the second measure is poured into the first measure, and after thoroughly stirring the whole is transferred into a dish. The quantity should be so arranged that the solution just covers the bottom surface of the plate to be silvered when resting upon wedges (wooden ones covered with india-rubber solution will answer) about a quarter of an inch in height. The solution being poured in, the plate is placed in silver. If the mixture become blackly turbid at once it is probable there is not enough of No. 2 present, whilst if it remain clear for two or three minutes there is probably an excess. When the solution turns inky black the silvering commences, and the dish should then be rocked slightly for about five or ten minutes, when, if correctly made up, the solution should become clear and flakes of silver float up to the top. The glass will now be covered with a coating of silver, and it should appear perfectly bright if the chemicals are *pure*, and if the plate has not been left too long in the solution. The deposit should be very nearly opaque; any light passing through should be of a deep indigo colour. There is often a little bloom on the surface, which, when the surface is dried, can be removed by a tuft of cotton wool. A surface which is slightly matt can be polished by a pad of *fine* chamois leather and a little jewellers' rouge. The pad should be warmed and the polishing done with a light hand. A green tint in the deposit indicates defective cleaning of the plate, whilst a purple tint indicates something wrong in the solutions."

Comparing these two sets of formulæ it will be seen that they differ very slightly, and mainly as respects the proportions employed. As we have said we, and others, have succeeded admirably with Mr. Burton's formulæ, and Captain Abney says of the other that failure with it is wellnigh impossible. Here the process of silvering glass rests at present.

It has been recently proposed to utilise salicylic acid in connection with ferrous sulphate for the purposes of development, or, more properly speaking, for the intensification of images already developed by other means. For this purpose the salicylic acid, which is but feebly soluble in cold water, is mixed (in saturated solution) with the ordinary iron developer, and with the addition of a few drops of solution of silver nitrate is applied in the usual manner. The salicylic acid, though possessing to a slight extent reducing powers, is said to retard the precipitation of the silver from the solution, and in this manner enables the iron solution to be used for a considerable time without becoming muddy. The new intensifier is also credited with the power of producing a much finer deposit than the ordinary iron solution, and hence an image of better quality. We have tried the substance in question in a variety of ways, but regret to say we can find nothing to recommend it in preference to pyro., or even to bring it into competition with the old form of intensifier. We have used it with ferrous sulphate alone and in combination with acetic and citric acids. Even in the absence of restraining acid the tendency of the solution to become muddy is very slight, but the intensification is, under these circumstances, not satisfactory. An explanation of the restraining action of salicylic acid may be found in the fact that decomposition occurs upon its addition to the solution of ferrous sulphate, as is proved by the production of a beautiful purple colour. If this colour be due to the formation of a salicitate of iron it is evident that sulphuric acid will be set free, which would sufficiently account for the anomaly of a reducing agent apparently acting as a restrainer. As a developer we find that the new solution possesses little power, a very long exposure sufficing only to produce a feeble impression.

SPOTS IN EMULSION PLATES.—INFLUENCE OF SILVER IODIDE IN EMULSIONS.

In looking over the interesting pages of your Almanac, which reached me a few days since, I was particularly attracted by some remarks of Mr. Henry Cooper, who touched upon the same subject that I had happened to take up in a short article contributed, viz., *Spots on Emulsion Plates*. I agree with him entirely in believing that in plates made with a preservative the preservative tends to diminish danger from spots and to limit their action. Once before in these columns I made this comparison with paper: a drop spreads rapidly and widely on unsized paper, whereas on sized paper its action is much slower and more limited. *Gum* has always been found valuable in preservatives, and is incidentally present in all plates made with ale or beer. It heightens sensitiveness, and also gives a sort of glazing to the film, which certainly has its value.

Of course in washed emulsions, if we are to avoid an additional operation, we must employ substances dissolved in the collodion, as Mr. Cooper suggests. Gum unfortunately does not dissolve in alcohol, and the gum resins that do dissolve are insoluble in water, and convert the collodion into a sort of varnish, into which water will not easily penetrate. *Tannin*, of which Mr. Cooper speaks, has the advantage of solubility in both alcohol and water, and when dried rapidly, as in the case of a thin film on a plate, forms a sort of varnish which, of course, dissolves in water. *Gallic acid* acts very curiously on sensitive films. It is well known that gallic acid easily reduces silver, and therefore one would be apt to expect, *à priori*, that applied to a film it would increase sensitiveness and diminish both cleanness and keeping properties. The exact opposite of this is the truth. It was known, even in the early days of photography, that a final wash of gallic acid increased the brightness of the image and the keeping properties of the plate.

I have myself made many experiments in this direction, and can say with certainty that gallic acid considerably diminishes sensitiveness and tends to give a clear, brilliant plate, easily managed in every respect from first to last, but requiring an exposure of one half longer at least. In fact, its properties seem to partake more of those of its acid character than of its reducing nature. Tannin (gallo-tannic acid), I think, acts much in the same way, though I cannot speak so much from direct experiment.

Notwithstanding these properties of gallic acid, it must not be brought into contact with free silver nitrate. For example: if potassium bromide is dissolved in water and gallic acid dissolved in the solution, and then solution of silver nitrate added in excess, the mixture soon darkens from reduction, unless very heavily dosed with acetic acid. Even then it soon changes if the excess of silver solution has been considerable.

Undoubtedly the great foe to dry-plate work is *dust*. It is commonly said that sodium chloride is so universally diffused in the atmosphere that almost any flame viewed by the spectroscope will show the characteristic D lines. How much more, then, may we not expect to find substances diffused in the air of a work-room which are in continual use in it—especially sodium hyposulphite? Silver nitrate claims a certain amount of care, because it is comparatively expensive; but hyposulphite costs next to nothing, and if, in weighing, a few crystals are spilled on the floor they are not worth picking up. They are presently ground in by the feet; the fine dust is scattered by movements, rises and settles again on shelves, amongst cloths, on garments, &c. Perhaps a spot on today's plate comes from hyposulphite spilled on the floor years ago, which previously rose in dust and settled on shelves, until disturbed by some unusual movement. What is then to be done? To wash the floor frequently and wipe off shelves, but not shortly before making plates; to avoid spilling hyposulphite as carefully as if it were gold chloride; and to take particular precaution with the plates themselves.

I sent to this Journal some years ago the observation that the ordinary wide camel's-hair or beaver brush will not satisfactorily remove dust from a plate—a fact that everyone may verify for himself. Suppose a dry-plate worker to take out a dozen clean glasses, dust them off carefully with such a brush, stand them in a row on a rack, edge them all with rubber, and then proceed to coat them. What will be the result? The brush will not have removed all the dust, but, unless the air be very humid, it will electrify the surface of the glass, so that that surface will attract every mote in the atmosphere that is near enough, and there will be plenty of time for this between the brushing and the coating. The resulting plates will probably yield a succession of disappointments.

Suppose, now, that the photographer takes his clean glass and edges a few plates, as the first operation. As soon as the first one edged has dried sufficiently not to smear, he takes a stiff bristle brush, such as is used by house painters (one-inch diameter is a good size), and goes over the plate—not lightly and gently, but roughly, and as if he knew that the dust would stay if it could. Then *immediately* after he coats the plate, and sets it instantly in a drying-box. For this purpose the box need have no special drying appliances, such as sulphuric acid or hot air; the object is simply to avoid dust, and a wooden box containing a rack is sufficient. Perhaps, also, we might take a hint from Professor Tyndall's observations on atmospheric particles, and moisten the edges of the box with glycerine. This latter idea I have not given actual trial to, though it seems it would be certainly useful; but in the matter of brushing I speak from multiplied experiences. In fact, anyone may convince himself by taking a clean plate on which dust has been allowed to settle and trying to clean it with a camel's-hair brush. If this be done by a well-lighted window it will easily be observed how insufficient the ordinary brushing is, and how often the brush may sometimes pass over a particle without removing it.

In the vexatious experience narrated by Mr. Cooper it is quite possible that the obnoxious dust may have settled before coating as well as after. Sodium hyposulphite is quite insoluble in collodion. A speck of hyposulphite dust would therefore remain undissolved by the coating operation. If the plate were to be used immediately, and liberally wetted before developing, the injurious action would be less than if the speck were gradually dissolved and moisture absorbed by the film out of a damp atmosphere.

I have found a very useful precaution to be that of brushing off the film with a broad, soft brush immediately before development. I do not offer this as anything new; doubtless others practise it, but I do not recollect to have seen it in print.

In looking over the Almanac I was glad to see that several contributors recognised the fact which I believe I first noticed—that the sensitiveness of an emulsion, whether washed or unwashed, is *increased by the presence of silver iodide.* This was strongly controverted when I first asserted it, and I observe that one of your contributors mentions the increased clearness and sensitiveness as a new observation. It was also affirmed by some that silver iodide could not be emulsified. Under certain circumstances silver iodide remains suspended longer than any other of the silver haloids. I have at this moment in my laboratory a precipitating jar in which a quantity of silver iodide was precipitated a week ago, using aqueous solutions. During all that time it has remained suspended, and now it is only the upper half inch of the liquid that has become clear. This case differs from that of most emulsion work, in that there was an excess of alkaline iodide present. But it is also to be remembered that a precipitate settles far more easily out of water than out of viscid liquids, like collodion. It is certainly true that when the operation is conducted in the manner which I recommended there is *not the slightest* difficulty in obtaining an emulsion. In all my experiments and plate-making I never met with a single failure in this respect. It is true that on first mixing it may happen that the whole of the silver haloid may drop to the bottom, leaving the liquid clear above it, and the precipitated material may have a coarse, crystalline look. This seems very discouraging, and perhaps the preparation is thrown away as a failure; but a shaking for a single minute will totally change this state of affairs. The crystalline precipitate breaks up into a state of the finest division, emulsifies and remains suspended, and gives a film of the finest possible grain. M. Carey Lea.

UPON THE DETERMINATION, BY PHOTOGRAPHIC MEANS, OF MINUTE PORTIONS OF TIME.*

The method for determining time by photographic curve pictures, which I described in a previous number of this Journal, had a want, on account of its being necessary to use a Hipp's chronoscope, which, as I remarked at the time, could only be supplied by the activity of the observer. This want was caused by the indispensableness of differential calculus, or, rather, of the computation of the minute errors introduced by the mechanism of the apparatus into the deduction. I therefore set myself the task of finding out a method which, at the same instant as the curve was photographed, would show on the same plate the time that had been required to produce the photograph.

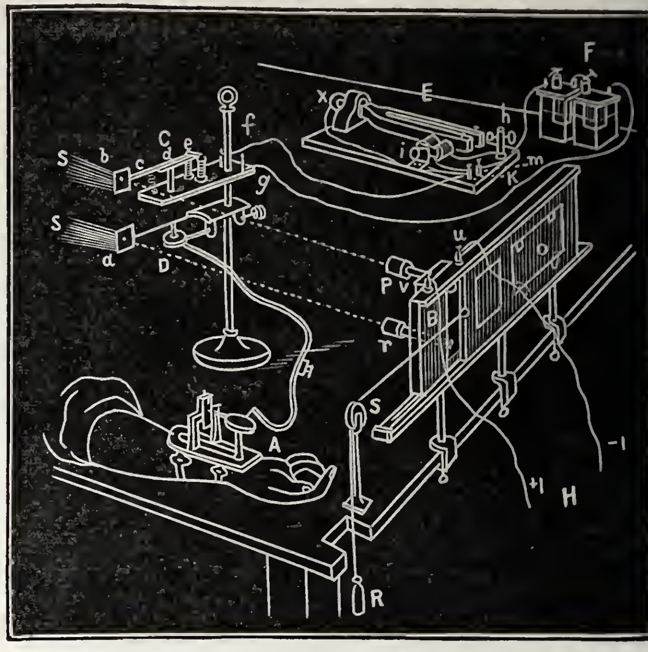
As readers of my former publications will remember, I have photographed sound curves, as well as the minute movements of the pulse and of breathing, both directly from the body and at a distance, where the physical movement was exactly reproduced and photographed. I made use, for transmission, of an electric current, or of thin columns of air enclosed in rubber tubes, according to the peculiarities of the movement transmitted.

It then occurred to me that I should obtain the exact curve calculation aimed at if I were to photograph a curve movement of known size or duration at the same moment, on the same plate, and directly above the curve with which I was still unacquainted, and whose duration was unknown. For this purpose I used a Marey's tuning-fork. The way in which this is done can only be made clear, to those who have not seen my instruments, by means of an illustration, on which account I give the following diagram with accompanying explanation:—

I assume, for example, that the pulse of the arm A is to be photographically drawn, and that one wishes to know exactly the duration not only of each separate beat of the pulse, but that its subdivisions are to be taken into consideration also. According to my previous experiments each individual pulse-beat consists of three or four smaller beats, which can only be graphically reproduced with absolute exactitude by means of the sensitiveness of the photographic sphygmograph.

The movement of the pulse is communicated by means of the apparatus A (which I described in my work upon *Light)* to the apparatus D, by which means the pierced sheet of mica *a* exactly reproduces the movement of the distant pulse A. Upon the same stand as the pulse-

FIG. 1.



Photographic Electric Pitch-fork Apparatus for the Determination of Time.

transmitting apparatus D a small electro-magnet C may be seen with a lever movement. To this lever *c* a pierced sheet of mica *b* is fixed. This small apparatus corresponds to the small electro-magnet (described in an article on the photography of sound), by the help of which the vibrations of a note sung by a human voice or struck by a pitch-fork were photographed. The electro-magnetic apparatus C is placed in connection, by means of conducting wires, on the one hand with the battery F, and on the other hand with the large pitch-fork E, which gives ten vibrations in the second—a sufficient number for the purpose for which it is used, viz., the determination of the time of the pulse vibrations.

Through this pitch-fork the whole electric current passes, entering at *m* and coming out at *k*. At *h* is a peg which lightly touches the fork, and by whose contact the current enters. When the fork vibrates then the electric current is broken. This break in the current is carried on the length of the little magnet *e* at C. At each swing of the pitch-fork the electric current is opened and closed.

Thus the electro-magnet *e* alternately attracts the lever *c d* at C towards itself and releases it again; and thus, if the pitch-fork give ten beats in a second, in the same time the sheet of mica will make ten small up-and-down movements, which may be photographed in the form of a curve, on the principle already described several times by me. The photographic manipulation is the same as that described in the previous article on this subject,* only that, instead of one lens, two lenses must now be fixed to the dark slide B, one above the other, at *p* and *r*. Both curves—that of the pulse which is photographed by means of the pierced mica *a*, and that of the time produced by the mica leaf *b*—are thrown upon the same plate, which is drawn along in the dark slide *o* before both lenses at once by the weight R, which runs over rollers. The current belonging to the pitch-fork leaves the carbon pole of the battery F, passing towards *m*, and from thence through the electro-magnet *i*, which keeps the fork in perpetual motion, to the peg *h*, and from that again through the fork itself, and then by the wire × to the spring screw *k*. From *k* it goes to *f*, then through the electro-magnet *e* to *g*, and from *g* back to the battery F. The shutters of both lenses are opened and shut, automatically, by the electric method described in the previous article, two conducting wires, × 1 and — 1, from a battery, supposed to be placed at H, communicating the galvanic stream coming from H to the closing arrangement of the lenses by the spring screws *v* and *u*.

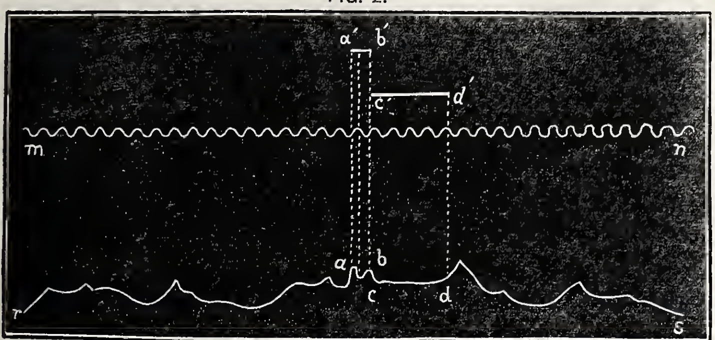
Fig. 2 is the *facsimile* of the image of the pulse-beat as taken photographically in the above manner. The upper curve represents the time; the under one is the photograph of the pulse-beat. Each little point on the upper curve represents one-tenth of a second, since by the movement of the pitch-fork this fraction is irrefutably indicated.

* Continued from page 475 of The British Journal of Photography, vol. xxiv.

*See The British Journal of Photography for October 5, 1877.

In *fig.* 1 the two lenses are represented as placed at some distance apart, in order to make the picture more easily understood. In reality, however, the lenses *p* and *r* are placed directly one above the other; and there is a contrivance for bringing them nearer to or moving them farther from each other.

FIG. 2.



Tuning-fork curve of ten vibrations per second and the pulse curve of a person suffering from disease of the heart.

When one wishes to know how many seconds the part of the curve from *r* (*fig.* 2) to *s* has required, all that has to be done is to count the hooks in the upper curve, and to divide the result by ten. If, however, one wishes to know what length of time an individual movement or pulsation has occupied, a line must be set off running parallel to the length of the curves, and from it perpendicular lines must be dropped, cutting the curves at regular distances, as shown by the dotted lines *a*, *b* and *d* (*fig.* 2). The little elevations marked off by the perpendicular lines show how we may ascertain quite sufficiently the exact duration of each movement. In the case before us from *a* to *b* represents one-tenth of a second, and from *c* to *d* four-tenths or two-fifths of a second. In the same way the duration of all the other teeth or jagged points of a pulsation may be measured with regard to time—a circumstance of considerable interest, and of special scientific value in the case of the pulse-curves of sick persons. The pulsations represented in *fig.* 2 are those of a woman suffering from disease of the heart; and, if they be compared with the photographed pulse-curves which appeared in the May number of the *Photographische Correspondenz* for 1874, it will at once appear how irregular they are.

Of course this is not the proper place for going more minutely into the details of the specially medical importance of the picture obtained, as in a photographic journal only the photographic technicalities of the subject can be suitably touched upon; but I may just say, in passing, that the diseased pulse in question goes at the rate of ninety beats in the minute, or one and a-half beat to the second, and that, as the diagram shows, in consequence of its irregularity the various beats occupy a varying portion of time. From the diagram one can see that after the trembling movements of the pulse between *a b* there is a pause, caused by a spasmodic contraction of the heart, and indicated by the line from *c* to *d* being continued in a horizontal direction. This time, during which the heart stands still, measured by the upper curve between *c* and *d*, is shown to be two-fifths of a second, and by the same method the time of the tremulous movement which precedes the contraction of the heart is shown to occupy (from *a′* to *b′*) but about one-tenth of a second. One would proceed in exactly the same manner in photographing the curves of sound waves or any of the other curve photographs already given by me; only it would then be necessary to replace the tuning-fork, which gives ten vibrations in a second, by one that would give 50, 100, 200, or even 500 vibrations in a second. There would then be upon the photographic plate, above the image of the curve of the sound whose number of vibrations was still unknown, a photograph of the curve of the vibrations of the tuning-fork, the number of whose beats in a given time was known. Let lines be then drawn so as to cut both the photographed curves, and the comparison between the known curve with the number of curve hooks of the unknown curve is at onee obtained, and at the same time it is seen how often a sound sung into an apparatus, like that described in the May number of last year, has vibrated in a second, and, what is more, it can be seen what note has been sung.

I hope that professional men, especially physiologists and natural philosophers, will adopt the methods described, and make use of them in their physiological and acoustic experiments. S. Th. Stein, *Dr.* —*Photographische Correspondenz.*

ON THINGS IN GENERAL.

I do not think that there would be many persons among those taking up a few numbers of the current photographic periodicals who would be inclined to class photography among the exact sciences. I was never more struck with its aspect in this respect than I have been of late. The old story of King James II. and his philosophers was forcibly recalled to my mind. He asked his assembled wise men, on one occasion, how it was that, if he took a globe brimming full of water and placed a gold fish in it, it would not cause the water to run over. A variety of profound explanations were offered, till, at last, one wiser than the rest replied, "Please, your Majesty, I doubt the fact." How often could this remark have been applied of late to some "facts" published under photographic auspices!

At a meeting of the Pennsylvania Photographic Association a query from the question-box was—"Why does an old bath give better results when nearly worn out than when renewed?" The assumption contained in the question was, strange to say, endorsed by all, though my experience of photographic text-books is that they say, when superexcellence of every kind is wanted—rapidity, cleanliness, and good keeping quality—a new bath should be made. Therefore, to this Association I should say, "Please, your Majesty, I doubt the fact."

I read also the other day an account of a very wonderful photographer who, having had brought to him to copy a portrait of a gentleman who was "wanted," told the police authorities, much to their surprise, that he was able to say from the appearance of the picture that it portrayed a red-haired man with sandy whiskers! This amount of penetration and insight is far beyond any experience of mine—so much so that I cannot but say, "Please, your Majesty, I doubt the fact."

Cartes de visite are retailed at one shilling each, and supplied to the factors certainly at not *more* than half that price; hence, when seeing intimated, as I saw the other day, that the sale of 100,000 portraits brought in a profit of three or four thousand pounds, and when I calculate that 100,000 sixpences is only two thousand five hundred pounds, the odd hundreds of which must be at least knocked off to allow for material and working expenses, I again say, "Please, your Majesty, I doubt the fact."

So also I should reply if I were told to expect a hearty response to the offer of a well-known photographer to hold an exhibition of other photographers' work, and that an augmentation of their balance would accrue to that deserving society, the Photographers' Benevolent Association. So, again, when a gentleman from Amsterdam makes a suggestion that Messrs. Wratten and Wainwright's method of extracting soluble salts from bromide of silver gelatine by means of alcohol might also be efficient when applied to prints partly washed out, and further suggests the recuperation of the alcohol by distillation, "which could easily be done in large establishments," and read, in reply to him, that gelatine is very permeable whilst paper prints are not; and, finally, when I read further in reply that "experiment alone can determine the value of the ingenious," I gasp out, after recovering from my astonishment in presence of the non-solubility of hypo. in alcohol, "Please, your Majesty, I doubt all these facts."

A course of study of The British Journal of Photography, in whose pages I read many years ago that hyposulphite of soda was an incorrect term when applied to the salt known to photographers under that name, would seem to be a very excellent study to some gentlemen whose acquaintance with the properties of this salt seems as complete as the freshness of their knowledge as to its nomenclature. I should be rather ashamed of our Editors if they deemed a leading article necessary today to call attention to the name.

There was interesting matter enough in Mr. Pearsall's and Mr. Cocking's papers, read at the South London Photographic Society, but I take exception, in a friendly way, to one or two points. Where, for instance, I wonder, except at the select drawing-classes at Minerva House, are lithographed drawing copies given to be copied in pencil? In fact, except for training the hand in outline drawing, where lithographed lines do as well as pencil, when is blacklead pencil used at all? I thought the old "shaded drawings" had vanished before the superior curriculum inaugurated by the South Kensington authorities. Mr. Cocking, too, spoke of minute variations of colour in the pupil of the eye, which is difficult to understand, seeing that the pupil is merely an abstract phenomenon and not a material substance. I feel bound to protest also against the assumption that photographs of foliage, for instance, give better transcripts of nature—truer, and more natural-looking—than the creations of the brush. In fact, I must flatly contradict it. Let any one who has the opportunity turn into the Grosvenor Gallery, now open, and look at some of the works of David Cox and Constable, and then ask himself which are the most suggestive of natural foliage—those wonderful paintings or the finest photographs extant, such as those of the noble trees in Windsor Park, that have been so much admired. I have not a doubt what the reply of a thoughtful judge would be—"the photographs fail in representing masses of tree foliage, except in a few instances."

Two men who may be considered as occupying the very foremost place among those who have benefited photography by their discoveries are Mr. Woodbury and Mr. Warnerke; hence when I saw the very severe letter of the former gentleman, I felt greatly surprised. I must say that Mr. Warnerke has not to any extent, to my mind, built up his reputation on the roller slide invented by the former gentleman. After receiving the telegram sent by the latter gentleman I cannot conceive how Mr. Woodbury could feel justified in casting the overt imputations of piracy that his letter conveys. The explanation given by Mr. Warnerke seems complete and sufficient. As a unit among the large body of photographers, my opinion of the great inventor of the Woodbury-type process would be greatly increased if he could withdraw more generously the imputations he has made. We cannot afford that investigators like these two gentlemen should have the foils in hand; they are too useful to us. Free Lance.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Feb. 28	Liverpool Amateur	Free Library, William Brown-st
„ 28	Oldham	Hare and Hounds, Yorkshire-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At a meeting of this Society, held on Tuesday, the 12th inst., the Secretary read the following

REPORT OF THE COUNCIL.

The Council of the Photographic Society of Great Britain, in presenting their report for the year ending 1877, will, as is customary, pass in brief review the work done during the session, and briefly glance at any special progress that has been made in the art or science of photography during that year.

In regard to the business of the meetings: it will be in the memory of the Society that, at the close of the year 1876, a trial was made of introducing some particular subject, and discussing it in its various bearings, and in the last report presented to the Society this practice was hopefully referred to. During the past year the experiment has been repeated with a certain measure of success, though on one or two occasions the members of the Society who were most conversant with the particular subject before the meeting could not be induced to join in it. This is much to be regretted in the interests of the Society, and it is hoped that if such members feel any delicacy in addressing the meeting that they may be induced to communicate their experiences to the Society's *Journal*, or to prepare beforehand (as was occasionally the case with some members) a short note giving details which would bear upon the subject under discussion.

Perhaps the subject which was more fully discussed than any other was the silver bath; and the Council are certain that new light was thrown on some of the phenomena met with in general practice, but that even then there still was a wide field for open discussion.

In referring to the list of papers read before the Society, it is a matter of regret to the Council that so few names appear as contributors. With two or three exceptions the communications have been made by gentlemen who are in the constant habit of contributing. It would greatly conduce to the welfare of the Society if, in addition to these gentlemen, other members of the Society would come forward and communicate their experiences. It rarely happens that any photographer does not meet with some phenomenon which may require explanation or elucidation, and if any member would make a note of his difficulties, and allow the Society to discuss them, much valuable information might thus be brought before it. Photography is essentially an experimental science, and progress towards the attainment of perfection can only be ensured by noting every phenomenon which is different to that usually encountered. If, then, members would give the benefit of their note-books to the Society a much more rapid advance in the required direction would be made. The Council earnestly beg that the above suggestions may be taken into consideration in order that the Photographic Society of Great Britain may still exist "for the promotion of photography." Still, as regards the progress in the theory of photography, there is much to be satisfied with. Many of the papers have been essentially on the results of research into some of the many unsolved problems still remaining; and it may be pointed out that it is only by maintaining a high standard of *general* papers that the results of researches in photography of any value can be hoped to be communicated to the Photographic Society, since there are so many societies which have acquired a certain prestige, and which are ready to receive the photographic contribution with the greatest advantage to the authors.

The Council have also pleasure in calling attention to the favourable position which the Society's *Journal* now occupies. After a careful consideration, the editor was not limited as to the space which it should occupy, and in consequence it will be found that the last volume occupied seventy pages of printed matter against fifty-five pages of the year before, the increase being made in the last half of last year's volume. It is hoped that the additional matter to be found in its columns will prove of value, though it does not absolutely belong to the transactions of the Society.

The meetings of the Society have been more largely attended this year than last, and from this fact it may be presumed that its proceedings have been of more interest to the members at large.

The following papers have been read during the year, viz.:—

1. *Photography from a Holiday-Maker's Point of View.* By H. Baden Pritchard, F.C.S.
2. *The Nitrate Bath: its Defects and Restoration.* By John Spiller, F.C.S.
3. *A Note on the Silver Bath.* By Colonel H. Stuart Wortley.
4. *Remarks on the Silver Bath.* By F. York.
5. *On a Neglected Method of Intensification.* By Capt. Abney, R.E., F.R.S.
6. *Further Note on Alkaline Development.* By Capt. Abney, R.E., F.R.S.
7. *On the Continuing Action of Light on Sensitive Carbon Tissue.* By J. R. Sawyer.
8. *On Emulsions.* By Herbert B. Berkeley.
9. *Note on the Silver Bath Discussion.* By R. W. Thomas, F.C.S.
10. *On Fog-Producing Emulsions and their Rectifications.* By Capt. Abney, R.E., F.R.S.
11. *On Emulsions* (second paper). By Herbert B. Berkeley.
12. *Theory of the Destruction of the Undeveloped Photographic Image.* By Capt. Abney, R.E., F.R.S.
13. *On the Production of Enlarged Photographs of Microscopical Objects.* By Edward Viles.
14. *Stray Thoughts on the Exhibition.* By Edwin Cocking.

It is in connection with the success of the photographic exhibition of the past year that your Council have to offer their heartiest congratulations, both from the financial as well as the art-scientific point of view. At no past exhibition have so many of the public been present, the number of persons who visited the exhibition of 1877 being 6,772. Several reasons conduced to such a result, two of which your Society, through its Council, may claim to have caused, viz., firstly the offering of medal awards in competition, which most undoubtedly brought together a collection of works upon which much thought and time had been expended, and which illustrated the advance made both in the art and science of photography; and, secondly, by securing the large series of Arctic photographs, which, being their first public exhibition, naturally attracted visitors.

Almost for the first time in the career of this Society there was a superabundance of pictures—many more, in fact, than could be hung. This enabled a more careful selection to be made than in former years, and your Council cannot help thinking that this was one of the prime causes of the superiority, in respect of the general excellence, of this exhibition over many previously held.

It is hoped that the next exhibition may be as successful as the last, though it must be mentioned that this year there have been special attractions to visitors which may not exist for the future.

The following analysis of the exhibition, by the Assistant Secretary, is appended, the records of which may be found to be valuable.

"There were 130 exhibitors. Of these 95 were professional and 35 amateurs; 44 exhibitors from London, 71 from the country, and 15 from abroad; 51 were members of the Society, and 79 non-members.

"Of the 51 members 24 were from London, and 27 from the country; 35 were professional and 16 amateurs.

"Of the 79 non-members 20 were from London, 44 from the country, and 15 from abroad; 60 were professional and 19 amateurs.

"551 frames were hung, containing 1,382 photographs. Of these 565 were portrait and figure subjects; 491 landscapes and architectural views; 126 animals and birds; 43 flower subjects; 38 pieces of sculpture; and 118 reproductions, &c. Included amongst these were 77 enlargements, consisting of 35 portraits, and 42 landscapes and others.

"On the table were some of the Arctic photographs, several books and albums containing photographs, making altogether, with those hung on the walls, an exhibition of more than 2,000 separate photographs."

With much regret your Council have to record the loss by death of one of the Society's most distinguished honorary members, viz., W. H. Fox Talbot, D.C.L., F.R.S.—a name which will ever be associated with the pioneer discoverers of photography, and of whom we, as Englishmen, must always be proud as the discoverer and investigator of that branch wherein lay the germ of its future practical utility and universal popularity.

In conclusion: your Council trust that the future year will furnish new matter for investigation and discussion, and that your Society will be aided in its endeavours to extend the field of scientific research, not only by the hearty co-operation of its prominent and more active members, but by the accession to its ranks of all who can appreciate, and consequently benefit by, the social reunions which the Society was established to promote.

Obituary.

W. H. Fox Talbot, D.C.L., F.R.S., was born in 1800. Educated at Harrow School, he went to Cambridge, and distinguished himself at that university by gaining the Porson prize, being Chancellor's gold medallist, and graduated in 1821 as twelfth wrangler. After sitting two years in Parliament he retired into private life, and devoted himself to science and literature. He contributed during his lifetime about fifty papers to the Royal Society. In 1826 he published a paper on light, viz., *Some Experiments on Coloured Flames*, and in 1827 *On Monochromatic Light*, and as late as 1872 he contributed a paper to the Royal Society of Edinburgh *On the Early History of the Spectrum Analysis.*

But it was in connection with chemistry that his researches were destined to become so valuable, and some of his earliest papers on the subject were written in 1833—*Researches on Chemical Changes of Colour*, and *Iodide of Silver*, &c. On January 31, 1839, Fox Talbot read a paper before the Royal Society, entitled *Some Account of the Art of Photogenic Drawing, or the Process by which Natural Objects may be Made to Delineate Themselves Without the Aid of the Artist's Pencil*, as also at the British Association the same year he read a paper on the same subject Early in 1840 he published the calotype process—being a wonderful advance on everything that up to that time had been produced—a patent for which he took out in 1841. The next patent that Fox Talbot took out was registered under the title of *Improvements in Calotype*, in which, amongst other things, he included fixing the photographic image on paper by means of the now well-known hyposulphite of soda—a solvent for the salts of silver which Sir John Herschel had discovered in February, 1840. Fox Talbot, in another patent, claimed the use of a transparent and flexible support in lieu of glass, consisting of paper rendered transparent and non-absorbent.

In 1852, at the united request of C. L. Eastlake, President of the Royal Academy, and Lord Rosse, President of the Royal Society, Fox Talbot presented his inventions connected with photography to the country, with the exception of, to use his own words, "photographic taking for sale to the public."

Of late years Fox Talbot appears to have turned his attention to other matters besides those connected with light and chemstry, and was engaged for some time in assisting to decipher the cuneiform inscriptions brought from Nineveh.

Hereafter, whenever the early history of photography is alluded to, the name of Fox Talbot must always occupy a prominent place, and his whole life is another instance of the power which independent means, when used for the culture of mental gifts, can become. His is a bright example, and it adds a lustre to English science.

The Treasurer read his financial statement of the affairs of the Society, as follows:—

BALANCE SHEET OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN,

For the Year Ending 31st December, 1877.

CASH ACCOUNT.

1877. Receipts.	£	s.	d.
To Balance from last year	253	5	10
,, Amount in hands of Treasurer and Assistant Secretary for Petty Expenses ..	6	15	5
,, Entrance Fees and Subscriptions	223	10	0
,, Sale of Journals and Advertisements	50	17	0
,, Admission to Exhibition and Sale of Catalogues	201	2	6
	£735	10	9

1877. Payments.	£	s.	d.
By General Expenses, including Rent of Gallery..........	161	4	9
,, Refreshments supplied at the two *Soirées*	18	2	2
,, Journal Account and Assistant Secretary's Salary.....	119	7	6
,, Exhibition Expenses, including Medals, Advertisements, cost of Arctic Photographs, and Printing the Catalogue	170	13	6
,, Balance in hand	266	2	10
	£735	10	9

ASSETS AND LIABILITIES.

1877. Assets.		£	s.	d.
Entrance Fees and Subscriptions due	£145 19 0			
Say less 30 per cent.........	43 15 9			
		102	3	3
Advertisements outstanding ..		25	3	4
Furniture, Tea Service, Black Board, &c.		18	18	1
Arctic Photographs and Surplus Medals		6	6	0
Cash Balance		266	2	10
		£418	13	6

1877. Liabilities.	£	s.	d.
Gas Arrears and Carrier, say..	12	10	0
Balance in favour of the Society	406	3	6
	£418	13	6

Audited and found to be correct,

(Signed) ROBERT C. MURRAY, F. BEASLEY, Jun., } Auditors.

February 11, 1878.

The following is a list of the Council and officers for 1878-9:—*President:* James Glaisher, F.R.S., F.R.A.S.—*Vice-Presidents:* Capt. W. de W. Abney, R.E., F.R.S., F.C.S., Francis Bedford, Professor G. G. Stokes, M.A., D.C.L., F.R.S.—*Treasurer:* John Spiller, F.C.S.—*Council:* W. Bedford, Walter S. Bird, Valentine Blanchard, J. H. Dallmeyer, F.R.A.S., T. Sebastian Davis, F.C.S., Hugh W. Diamond, M.D., F.S.A., W. England, Samuel Fry, Jabez Hughes, Lord Lindsay, F.R.A.S., Peter Mawdsley, W. Mayland, H. B. Pritchard, F.C.S., H. P. Robinson, J. Traill Taylor, R. W. Thomas, F.C.S., G. Wharton Simpson, M.A., F.S.A., Colonel H. Stuart-Wortley.—*Hon. Secretary:* H. Baden Pritchard, F.C.S.—*Assistant Secretary:* Edwin Cocking.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The second "popular" evening of this Society for the session was held in Queen-street Hall, on the evening of Wednesday, the 13th inst., when Mr. W. H. Davies delivered a lecture, entitled *Here and There in England*, which was descriptive of a tour from the English lakes through Yorkshire, Derby, Stafford, Worcester, Warwick, and Oxford to London, introducing a large number of very beautiful transparencies supplied by Mr. F. York, 87, Lancaster-road, Notting-hill, W. These views were exceptionally fine, and elicited constant expressions of approbation from a keenly-appreciative audience, which was kept in great good humour by the pleasant manner and graphic descriptive power of the lecturer. In introducing his subject Mr. Davies said:—

Before authentic British history had an annalist the natural features of our country must have had a very similar aspect to many of the views I shall have to bring before you this evening, while many of the others are connected in a very curious way with the present war in the East—a war which is not of today or yesterday, but one which extends backwards into history more than a thousand years. It is, in my mind, beyond a doubt that but for the crusades and crusaders with their numerous followers we should not have had many of the magnificent examples of architectural beauty which will be presented to you this evening. It is certain that at the time when we in this country were little removed from barbarism, letters, science, and the arts—more especially the art of architecture—were either in their full glory or were even then in their decadence in the East; and but for that unceasing war of the cross against the crescent the barbarous western believers in the cross would have remained barbarians for a much longer period than they did. If the wars of the crusades did nothing else they taught the Christian warriors and their followers many of the sciences, notably that which lies at the foundation of photography—chemistry. Without the potent aid of that natural magician we could not have shown you, as we will tonight, by the aid of the so-called magic lantern, the verisimilitude of many of those baronial and ecclesiastical monuments of art of which our country is so proud, and with which she is so well endowed—edifices that show how well our forefathers studied Eastern architecture and adapted, beautified, and glorified it until it seems as if in the culmination of what we call, or miscall, "Gothic," the very pinnacle or acme of architectural design and execution had been reached, and that nothing was left for us but to admire and, if possible, imitate it. I might go on talking and amplifying for an hour on this and cognate subjects connected with the views we have to display this evening; but I know, from a tolerably long experience in the Society and of these meetings, that the audience naturally do not come so much to hear as to see, and therefore I will draw my brief address to a close with two observations. The first is that we are obliged to Mr. Frederick York, of London, for the use of most of the slides to be used tonight, and to whom the Society is under a debt of gratitude, not only for this evening's exhibition but also for several previous ones. My second remark is that those of the present audience who are not already members of the Edinburgh Photographic Society should join at once. It is not necessary that you should be photographers, but merely that you should wish well to the art-science of photography, as this is, and has always been, essentially an amateur society. It has nothing to do with photography as a profession or a business, but simply as a science and an art; and it may be joined by ladies as well as gentlemen. Lastly, though not least, but yet little, the annual subscription is only five shillings, and this year we intend presenting every member who has paid the subscription a fine photographic picture, which will be worth more than the entire value of his or her subscription. We are enabled to do this partly by the large mass of gratuitous labour which the council and office-bearers undertake, and partly by the large amount of *lay* element—if I may so call those members who join us mainly, if not entirely, to support what is at this moment one of if not *the* most flourishing photographic societies in the world, and who financially form the backbone of the Society. Our secretary, Mr. Pillans, or some of his friends, will be in waiting in the side room to take the names of ladies and gentlemen who may wish to be proposed as members of this flourishing Society; but I am bound to warn them that they must pass through the ordeal of the ballot before they can attain the high honour of being a member of the Edinburgh Photographic Society.

At the conclusion of the lecture, on the motion of Dr. Thompson, a hearty vote of thanks to Mr. Davies concluded the proceedings.

BERLIN PHOTOGRAPHIC SOCIETY.

A Meeting of this Society was held on the 4th ult.,—Dr. Vogel, the President, in the chair.

The President commenced the proceedings by reading a communication from Herr Wilde, of Görlitz, upon dry plates. The letter was accompanied by a number of landscapes on dry plates. He (the President) remarked, with reference to the foregoing, that he had compared Herr Wilde's developer with Mr. Warnerke's, and found that they were very much alike, only Wilde's contained a little gelatine dissolved in glacial acetic acid, which acts as a retarder. The absence of this gelatine was, he thought, the principal reason why a shorter exposure was sufficient with Warnerke's developer.

The developer recommended by Herr Wilde for use with his dry plates is as follows:—

A.

Pyrogallic acid	5 grammes.
Alcohol	25 c.c.
Distilled water	25 c.c.

B.

Bromide of potassium	5 grammes.
Distilled water	75 c.c.

C.

Gelatine	3 grammes.
Glacial acetic acid.......................	20 c.c.
Distilled water	400 c.c.

D.

Carbonate of ammonia.....................	25 grammes.
Distilled water	150 c.c.

(The carbonate of ammonia must be pounded very fine and dissolved in warm water.) Shortly before use mix—

A	40 drops.
B	20 ,,
C	10 to 15 ,,
D	15 c.c.

Mixed in these proportions, with a proper exposure, the negatives developed will, almost without exception, be good.

Herr Wilde also wrote to say that the glass printing process of the State Printing Establishment was already described by Herr Lemling in his book on photo-verrotype. To this it was objected that no one had seen any results of Lemling's process, while the State Printing Establishment was certainly the first to produce superior results in glass printing.

Herr Liebmann had found by experience that the results of glass printing depended very greatly upon the sort of printing ink chosen, and regretted that that point was so seldom touched upon.

Herr Burchard said that the ink used for lichtdruck in this case should be very weak and thin, and that it was, therefore, impossible to get a good impression from a lichtdruck that required a fatty ink.

Herr Quidde remarked, in reference to Herr Wilde's method of preparing emulsion cotton, that when the ingredients were first poured together the water of the gelatine emulsion precipitated the collodion cotton, and the alcohol of the collodion threw down the gelatine, and, on redissolving, the cotton only dissolved, the gelatine remaining still insoluble in alcohol. It seemed to him not impossible that the cotton might be improved by this process, and that perhaps it combined the properties of precipitated and of gelatinised cotton. Still he did not see why Herr Wilde used a gelatine emulsion and not a simple gelatine. The experiment was so conducted that the bromide of silver of the emulsion was obtained in the precipitate, because, as was well known, it did not dissolve in alcohol; and, besides, it adhered so fast to the gelatine that, after redissolving, the greater part of it would remain in the gelatine.

Herr Schaarwächter exhibited a number of portraits taken with Seavey's backgrounds, and also a few glass etchings from the establishment of Göbel, of Witten, partly etched by acid and partly by sand blast. The Brothers Burchard also showed etchings on flashed glass. The last two exhibits gave rise to a discussion as to their suitability as permanent emulsion solution supports for carbon transparencies, the majority coming to the conclusion that while Burchards' etchings were suitable those of Göbel were scarcely fine enough.

The President then exhibited three views taken by the Baron des Granges of an object from the same standpoint but with different lenses, viz., a Steinheil aplanatic, a Steinheil wide angle, and a Dallmeyer D lens. The pictures were all sharp alike.

Herren Burchard showed a large photograph, being a reproduction of the celebrated map of the world, drawn by Professor Schmidt, of Athens, and consisting of twenty-five sheets fifteen inches square. The original represented the labour of thirty years. It had been purchased by the Government for 14,000 thalers, and entrusted to the Brothers Burchard to be reproduced photographically. Herr A. Burchard described the difficulties of the work.

It was then mentioned that M. Scotellari had applied for a German patent for his objective shutter, and a discussion followed on the patent law.

The President said that Herr Obernetter, of Munich, had received from Herr Gutekunst, of Philadelphia, a panorama, 3.24 metres in length, of the Philadelphia exhibition. This panorama Herr Obernetter had forwarded for exhibition to the Society, and he (the President) herewith produced it, remarking, at the same time, that such a long strip of paper would be silvered by the help of rollers which guided the paper equally across a silver bath.

Herr Schaarwächter thought that the negatives had been stripped off, placed together, and then all printed at once, otherwise the equality of depth shown in the prints before them could scarcely have been obtained.

Herr Reichard asked how the faulty varnish he had complained of at a former meeting, and a sample of which he had given to the President to experiment with, had turned out.

The President had not yet observed any change in the plates he had varnished with it.

Herr Reichard had not observed any rents in those he had himself varnished with Besler's varnish, which he had been using since the failure of the one he was accustomed to use.

The meeting was then adjourned.

Correspondence.

Voyage to Australia.—Photography in Capetown and On Board Ship.—The Government Printing Office in Sydney.

Were it not the fear of certain frowns, long scratches of the pen, and other unmistakable signs of editorial displeasure, I should have been tempted to have commenced my Australian correspondence with a dissertation on the brotherly love of the Melbourne freemasons, the beauties of Sydney harbour, with its lovely islands, bays, rivers, &c., &c.; but I remember having read some years ago in your valuable Journal the letters from your special correspondent in the east, and, being personally acquainted with him and much respecting him, have taken his advice, viz., to keep as near as possible to the doings of our brethren in the colonies. Though at that time he was rather inclined to wander from his subject, I suppose now (being fourteen years older) he knows better.

I will not weary your readers with the details of the voyage, which has become an ordinary undertaking. I embarked at Gravesend on board the steamship "Stad Amsterdam," on October 25th, 1877. We called at Plymouth to take in mails and passengers, and sailed thence, with 368 souls on board, including the crew, October 31st. We crossed the line on November 14th. On the 25th we again sighted land, and in a few hours the steamer was alongside the wharf at Capetown. The passengers here landed, and were soon to be found scattered about in different parts of the capital of the Cape Colony.

It being Sunday we had nothing to do but wander about, visit churches and chapels, hear sermons, and drink Cape wine or drops of whiskey. On Monday morning, early after breakfast, we commenced seeking after sights, and with the characteristic curiosity which distinguishes correspondents in general, and photographic ones in particular, I soon found myself among the objects of my researches.

There are several well-to-do photographers in Capetown, and one or two exceptionally good artists. I first visited Mr. Bernard—a gentleman who has long been a leading man in Capetown, and has acquired a very good business. I then went over the establishment of Mr. Bruton, late of Port Elizabeth, who showed every kindness that a gentleman could do to a poor wandering photographer. His studios are the first in the colony, the waiting saloons being large and elegantly furnished, reminding one more of a London West-end establishment than of a South African one. All the walls were covered with specimens of the carbon process, which is well represented, and Mr. Bruton informed me that a gentleman was at that time receiving final instructions at the Autotype Company's works preparatory to coming out to work that very beautiful process in his establishment. That, however, is only one portion of this gentleman's programme. Mr. Bruton is one of those genuine photographers who love their art and consider no sacrifice too great to further its progress; so he was shortly going to introduce some photo-mechanical process into the colony, and intended visiting England very shortly for that purpose. I much regretted not being able to accept the proferred hospitality of Mr. Bruton and visit his country house; but, not wishing to make a longer and forced stay at Capetown, I returned to my quarters, having brought away with me a material memento of my visit to Mr. Bruton in the form of some very nice cabinet portraits of Stanley, the African traveller, and some of his Arab attendants.

I could not leave the Cape without expressing my surprise that the Government should not have followed in the steps of our other colonies and introduced photography into their various departments, it having elsewhere proved so useful.

We bid adieu to Cape Colony, and were soon being rolled about in one of those big seas only to be encountered in the neighbourhood of the Cape.

I now began quietly to get ready for trying a few plates, by the wet process, on board; and it soon became known that there was a disciple of photography among the passengers. As soon as we got out of the heavy sea my first care was to find a place that would serve the purpose of a dark room, and, thanks to the doctor—a thoroughly-good and kind-hearted Irishman—I soon found where I might not lay my head, but my bottles. Collodion, glasses, bath, and all the other photographic items were soon in place, and having again requisitioned my good friend, the doctor, I began the sacred rites. No. 1—over-exposed; No. 2—everybody had moved by a sudden lurch of the vessel; No. 3—all right; No. 4—ditto. Great was now my confidence. All difficulty seemed to have been overcome, and in the future tradition will speak of the fine old "Stad" by means of photography. Alas! how fickle is fortune! and how soon the brightest hopes may become blighted! In my excitement I had momentarily forgotten that I was not on *terra firma* but in the middle of the Indian Ocean, lat. 40° 28', long. 61° 11' east of Greenwich, steaming away at the rate of thirteen miles an hour.

Soon Father Neptune (who, I suppose, had been watching me, and was not at all pleased with the liberties I was taking) became angry, and matters around me were gradually growing more and more unsteady. I managed at first to baulk the grey-headed old gentleman by propping up this and putting that nicely into a corner, but not to much purpose; for all at once a roll a little heavier than the preceding ones sent us to leeward, and bath, bottles, and correspondent had the same and sudden impulse to proceed to the other side of the cabin as quickly as possible, regardless of all obstacles. My object was attained without changing the graceful position that photographers sometimes assume when working in very small tripod tents. The result was visual and chemical confusion and double decomposition. Suddenly I remembered that my three-legged friend might perhaps have had a similar inclination; so by a sudden rush up the companion ladder I arrived in time to find that camera and stand had been slightly displaced by old Neptune, had only just missed knocking a little boy and girl into the sea, and finally had found its centre of gravity in the lap of a quiet, elderly lady, who naturally imagined that the machine could do nothing less than explode. I quickly, however, calmed her, and apologised for the apparent rudeness of my apparatus, which, like herself, was not used to rough weather at sea.

This little episode caused great diversion on board, and at the same time put a stop to further proceedings for that day. I soon, however, got things into shipshape again, and was urgently requested to take some little groups (I only had quarter-plate glasses) of my fellow-passengers. It will not be difficult for my readers to understand that I felt myself the most independent of photographers, knowing that my clients could not go over the way to a rival establishment; so I had it all my own way, and they kept me hard at work printing for two or three days afterwards. I will send the Editors some specimens by another mail.

If ever any of my brethren of the photographic fraternity "go down to the sea in great ships" they should take their apparatus with them. It is a pleasant pastime, and need not be altogether unprofitable. But what is that cloud-like line on the horizon? Surely it is land! Yes, the dear land again! It is Kangaroo Island, lying just outside our point of destination. For an hour we run about talking to everybody, telescopes and opera glasses being in great requisition. At 9.30 p.m. we passed the revolving light on the island, and saluted the inhabitants generally—kangaroos and others—by sending up some rockets and firing off two guns. Our salute was replied to by the burning of blue lights. The voyage was now all but ended. To pass Adelaide and Melbourne, and finally find ourselves safely housed at Sydney, was but the work of a few days; and now memory comes in to fill up the place of a very agreeable and well-conducted voyage. We have left the old world behind us, and, now, hurrah for the new!

Having come out here for the purpose of introducing some of the photo-mechanical processes into the photographic department of the Government printing office, I at once reported myself to the Government printer, Mr. Richards, sole director of this intelligently-conducted and important department. I find that photography has been largely employed here for some years past, the general sizes used being 15 × 18 and under. The department possesses, however, a very fine apparatus, by Dallmeyer, for plates about double the size.

In my next communication I hope to say something more particularly photographic, and trust your numerous readers (as also yourselves) will grant me indulgence for all shortcomings in a simple lover of his art.

Sydney, January 1, 1878. L. H.

"THE GELATINE PROCESS."

To the Editors.

Gentlemen,—I congratulate the Rev. H. J. Palmer on surmounting a difficulty with reference to the use of ox-gall in the production of gelatine films for photographic purposes.

Just forty years ago, when occupied in the laboratory at Giessen in researches on the bile, I discovered that the mucus of the gall bladder is a most energetic *catalytic* body, and that in its presence, especially at a temperature over 70° Fah., the bile becomes rapidly decomposed. Having, then, obtained perfectly fresh ox-gall, the first step is to precipitate the mucus by means of alcohol, glacial acetic acid, or lactic acid, which, for certain reasons, I prefer.

Mr. Palmer is quite right in modifying his original formula by diminishing the quantity of ox-gall, as it is exceedingly hygroscopic, and in too large a proportion yields a tacky film.

There are many other details necessary for producing a suitable film, with which, I have no doubt, Mr. Palmer is acquainted. Wishing him every success,—I am, yours, &c., Geo. Kemp, M.D.

February 19, 1878.

P.S.—The film I enclose was made before I saw Mr. Palmer's communication in your issue for February 15th.—G.K.

[The enclosure is one of the most perfect films we have ever seen.—Eds.]

PREPARATION OF OX-GALL.

To the Editors.

Gentlemen,—As the Rev. H. J. Palmer observed in his paper on *A Further Improvement in the Gelatine Process*, read before a meeting of the Liverpool Amateur Photographic Association, ox-gall as supplied by the butcher is not a pleasant article to deal with. Its important quality of rendering a film of gelatine non-adhering to glass may, however, bring it into use in the preparation of portable gelatine negatives.

The following directions for purifying it, extracted from Spon's *Workshop Receipts*, may be of use:—

"Evaporate fresh ox-gall to a syrup, and then spread it out to dry in a thin layer on a plate placed near the fire. This is the pharmacopœia plan, but it takes none of the colour out of ox-gall; it simply desiccates the bile, which can in this condition be preserved from putrefaction for any length of time in closely-stoppered bottles. If fresh ox-gall is evaporated on a water bath, and then treated with alcohol, the mucus and epithelium are precipitated; but the colouring matter still exists, and is not precipitated or discharged by digesting. Again: boil one pint of fresh ox-gall with one ounce of alum, and in another vessel a second pint with one ounce of common salt; after standing three months in separate bottles the clear portion from these solutions is to be mixed for use. But the solutions do not become altogether clear, although they keep very well without putrefaction. Ox-gall may be thoroughly decolorised by slightly acidulating it with acetic acid and passing through it a stream of chlorine gas."

My own experiments have been confined to what is above designated the "pharmacopœia plan." The resulting product dissolves readily in the gelatine solution, and the films, when dry, are easily stripped from the glass.—I am, yours, &c., J. D. Lysaght,

66th Brigade Depôt, Naas, *Lieut. Royal Madras Fusiliers.*

February 13, 1878.

IMPROVEMENTS IN CARBON PRINTING.

To the Editors.

Gentlemen,—We shall not trespass further upon your columns by continuing a controversy which can scarcely have the slightest interest for your readers. All that we ever complained of was that Mr. Johnson, by an erroneous quotation, in what may fairly be considered one of the text books of photography, placed us in a false position before the public as regards the manufacture of tissue in *permanent* pigments. As we could not in any other way rectify this misconstruction we had no alternative but to appeal to your columns.

But even in his last letter Mr. Johnson seeks still to establish his position by a reference to an edition of the *Autotype Manual* published two years ago, and then naïvely asks—"Where is the offence?" We think we have already pointed out the "offence" to him with sufficient clearness.

In conclusion: we again assure Mr. Johnson that we are in no way affected by his claims; that we at once concede to him the *publication* of *a* method of treating alizarine; and, further, assure him that the process employed by Mr. Sawyer is based upon the one indicated to Mr. Johnson in May, 1876, in which neither lime, magnesia, nor any other similar matter is, or has ever been, employed.—We are, yours, &c.,

February 19, 1878. The Autotype Company.

THE CONSTRUCTION OF GLASS HOUSES.

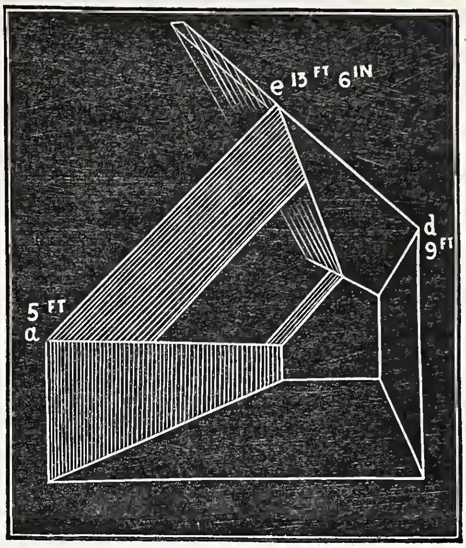
To the Editors.

Gentlemen,—In The British Journal of Photography of the 8th inst. Mr. H. Hamilton gives a description of a studio he is about to build, and wishes for information as to the modifications of the proportions given.

Many competent men have written books and articles on their experience under different lights which have been a great assistance to the advancement of our art; whilst others have run off to the Patent Office with their proportions for the "perfect studio." But as this is a subject of the greatest importance to photographers, being the foundation-stone of good work, too much attention cannot be given to the study of light and lighting.

Considerable practice and careful study in some of the leading studios in England and America convince me that, with the slight modifications suggested below, Mr. Hamilton will have a studio which, for simplicity and facility in working, will be difficult to improve upon.

The sketch of the interior is given in proportionate measurements, so as to show the pitch of the roof. The eaves being five feet high (*a*) the light below this would never be wanted in *this* studio, and it will give more freedom for working the backgrounds. It would even be advisable to raise the eaves of the opaque parts or ends as high as seven or eight feet. This would not look quite well, but would be more than compensated for by the great power thus secured over the background, which is of the greatest importance, as a little thought will readily show.



The ridge is not in the centre, but eight feet six inches from the north wall, and four feet six inches from the south wall. It is thirteen feet six inches high, and gives a full, open light of about twenty feet by twelve feet. The point *d* is nine feet high, and the room thirty feet by thirteen feet, and five feet opaque at each end—not less (this is a point often overlooked), as it does not allow space to move the backgrounds at any desired angle, or to keep them well from the sitter. I have used the same background six feet from the sitter, and at other times as close as possible, to produce a harmonious effect in the picture. *e e* is a sun-shade, the supports being carried out about four feet, and at the same angle as the opaque roof, made very strong. There are many ways of doing this; but I should think the supports could be carried out from underneath the slating. On the top of these lay planks six or seven inches wide—not flat, but similar to half-open Venetian blinds. This will prevent splitting by heat, and will give free play to the wind to pass through without the fear of finding the shade in a neighbour's yard some fine morning. Great importance should be attached to the erection of this shade, as any rays of sun striking the glass are most injurious to the production of good work.

The next suggestion I strongly recommend, as there are about a dozen advantages attached to it; that is, to use blue glass for two feet up along the bottom of the light, and also blue glass in each end sash from top to bottom. There may be a matter of difficulty in getting the right shade, but it is worth more money and trouble than it will cost. Neither blue muslin or staining will give the desired effect to be got with the glass. This is no theoretical suggestion, but a practical hint. I have never seen it in exactly this form, but careful study of different effects points this out as the simplest form of perfect studio. It can be worked almost without a blind, and will be very quick. In this instance the studio should be kept to the west end of the space if possible. Do not be afraid of a little extra expense in making a firm and solid floor. Use iron sash-bars to carry the glass, and do not forget ventilation.

Hoping that the importance of the subject will be accepted as an ample apology for the length of these suggestions,—I am, yours, &c.,

Twyford Villa, Quarry-road, Ryde, John Cowell.

February 13, 1878.

P.S.—The blue glass should be a decided blue, but very transparent.—J. C.

Spontaneous Explosion of Toughened Glass.—In the *Bohemia*, Professor Ricard, of Trchewan, tells the following tale:—"A child's drinking glass was bought one day at Saaz, for about seventy kreuzer, and for six months it sustained its character of unbreakable glass. But about nine o'clock one evening in the sixth month it was used in drinking *eau sucrée*, and was then placed, with a silver spoon in it, upon a large oaken table. Suddenly I heard from my room a violent explosion like a pistol shot, and a metallic sound. I ran in, and saw the whole floor strewn with needles and splinters of glass scattered thinly and widely—and not only upon the floor, but the bed, the table, the washstand, the carpet, and the clothes hung up were covered with these shreds. I looked everywhere for the cause of this explosion, and at last remarked that the child's drinking cup was gone. The empty glass had exploded—without apparent cause, without the approach of a light, and having a spoon in it—with such extraordinary force that the whole household was frightened. I relate this story, therefore, not only for the information of chemists and natural philosophers, but also of those families who believe that in this so-called unbreakable glass they possess remarkable and unspoilable playthings or useful household goods, to show them that when such an explosion occurs it may cause not only fright but mischief." To the foregoing the editor of the *Polytechnichen Notizblatts*, adds that such explosions of tonghened glass, often without any apparent cause, have been pretty frequent of late, and appear to be on the increase—a circumstance likely to prevent people from using toughened glass until the cause of this evil property has been discovered and removed by a change in the process of manufacture. The explosion is, doubtless, caused by some change in the extreme tension of the fibres of the toughened glass, and it is probable that if the tension were removed the glass would no longer be tough.

EXCHANGE COLUMN.

A new camera lucida, by Elliott, optician, Strand, in case complete and in perfect order, will be given in exchange for a No. 1 Steinheil doublet, back focus 3½ inches, in good condition, or for a portable bellows camera for plates 7½ × 5, in good order.—Address, W. Mackay, 15, Ness Bank, Inverness.

ANSWERS TO CORRESPONDENTS.

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

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

⁂ Several articles and notices are left over in consequence of a press of matter.

T. B. Howe.—The forms will be forwarded.

J. W. G.—Yours, containing the misdirected letter, with the other enclosures, received.

George Fox.—A "kit-cat" picture measures three feet six inches by two feet four inches.

W. W. W.—Try Solomon or Marion and Co. But we do not believe that what is wanted can be obtained.

C. G.—You cannot be prevented from photographing any of the buildings unless you create an obstruction.

C. Magram.—We are not able at present to give the information, but hope to be able to do so, privately, in a few days.

Lambertypist.—The only fault we have to find with the *cartes* is their peculiar tone, which is strongly suggestive of "plum jam."

S. Wolstenholm.—This is a matter for the county court. You will certainly gain your case if you elect to have it decided in that manner.

W. M.—Your proposed method of using ferrotype plates seems quite feasible. After development the films might easily be transferred to glass plates if required.

Richard.—We do not think that the fault is attributable to the paper. It is probable that the exciting bath is not in a condition to work harmoniously with the paper.

Alfred Swan.—Your query ought to have been addressed to a journal devoted to mechanical pursuits. *We* cannot offer any opinion on the merits of rival safety-valves.

J. B. Street.—The *Art-Student* was a journal devoted to art. It was conducted by Mr. A. H. Wall, but its existence did not extend beyond the publication of two volumes.

Subscriber.—Without entering into the queston of the permanence of the aniline colours, we advise you to make use of the pigments ordinarily employed by painters in water-colours.

J. Ekralc.—Our acquaintance with the "new" Voigtlander lens is confined to the description given in the patent specification we published three weeks ago; it will, therefore, be evident that we are not in a position to offer any opinion on the merits of the lens as a photographic instrument.

Argosy.—While we quite agree with your statement that a "scientific fact can never be written down," we are at variance with you respecting the basis of this assertion; because your imaginary "scientific fact" has not, cannot have, and never will have, any existence so long as the human eyes and the optic nerves are formed in the fashion in which they now exist. If you call when you are next in town we shall have pleasure in giving you a demonstration of the unsoundness of your position.

J. Schofield (Heaton Norris).—Received just as we are going to press. Will have attention in our next.

Ajax (Leeds).—Try the following:—Coat the glass plate with albumen; when dry immerse in a strong solution of nitrate of silver for a minute; then wash thoroughly, and immerse in an aqueous solution of the aniline dye.

One in a Fix.—Why not reduce the strength of the bromide? Let the salting solution contain only eight grains of bromide of potassium, the sensitising bath being of the strength of seventy grains to the ounce.

G. R. B.—A solution for gilding by means of the galvanic battery may be prepared by mixing a strong solution of chloride of gold with a saturated solution of cyanide of potassium. Pour the latter slowly into the gold solution, and dilute by the addition of three times its volume of water.

Varnish (Belfast).—We have made good varnish by a formula similar to that adopted by you with the exception of the mastic, which we omitted. It is probable that in your case the oil of lavender may have been impure. Without receiving a sample of the varnish to try we could not give you any further clue to the failure.

Country Parson.—The chief difference between the two toning baths is this:—The carbonate bath must be used within a brief period after preparation, as it rapidly decomposes, whereas the acetate bath will keep good for a considerable time. To be used under the circumstances described by you the carbonate bath will prove much the better of the two.

Verango.—The great hopes that were at one time entertained of the services to be rendered to photography by magnesium have not been realised. The reason for this is to be found in the fact that the *sodium*, which is the key to the production of magnesium, can be utilised otherwise to greater pecuniary advantage than in manufacturing magnesium in large quantities and at a low price.

H. A. S. O.—A wet collodion plate *can* be developed by the alkaline pyro. method. Before applying the developer it is requisite that the free nitrate of silver be washed off. It is singular that you should have given yourself the trouble of "pondering over this matter for three weeks" without putting yourself to the further trouble of making a single trial, by which your doubts would have been instantly dispelled.

H. J. H. D.—Your enclosure reminds us of what has been said of Queen Elizabeth and her portraits, in which that strong-minded royal lady would not allow her artists to paint any shadows. It is, of course, quite a matter of taste; but if you wish to secure fame as a skilful photographic artist it is indispensable that the shadows be much deeper. The portrait is somewhat insipid, owing to the fault we have indicated.

"Negative Bath."—1. If the bath be acid and out of order add a weak solution of bicarbonate of soda until a permanent milkiness (in a slight degree only) is produced; then place it in the sun for a few hours.—2. A bath is neutral when upon immersing slips of blue and reddened litmus paper neither undergo a change of colour.—3. A saturated solution of iron would prove quite unmanageable as a developer. Try fifteen grains to the ounce of water, with a drachm of glacial acetic acid.—4. A silver bath will not sustain any harm whatever by being exposed to daylight when not in use.

Received.—W. J. C.

"Photographic Rays of Light."—Under this designation a new journal has been started by Mr. Richard Walzl, of Baltimore, U.S. It is to be issued quarterly. Judging from the present number its conductor, Mr. Walzl, has not lost any of the energy with which he conducted his former journal, the *Photographer's Friend.* When space permits we shall give some extracts from this new candidate for the suffrages of the photographic community, and to which we offer a cordial welcome.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.
For the Week ending February 20, 1878.
These Observations are Taken at 8.30 a.m.

Feb.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
14	29·80	S	49	50	50	45	Raining
15	30·11	SE	40	41	53	38	Foggy
16	30·31	SW	45	47	53	40	Cloudy
18	30·11	W	47	49	56	48	Dull
19	30·51	W	39	40	50	38	Dull
20	30·30	SW	42	44	48	39	Dull

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 930. Vol. XXV.—MARCH 1, 1878.

ON DUST AND DUST PREVENTIVES.

There can be little doubt that dust, always one of the photographer's greatest enemies, has latterly assumed an even greater importance—at least to dry-plate workers—in consequence of the discovery that it is the chief, if not only, cause of the numerous sorts of spots to which emulsion plates are found to be liable. It would, perhaps, puzzle anyone to give a definition which would cover every phase of the evil, if looked at from every possible point of view; but for the purposes of the present indictment against dust we may define it as any matter whatsoever which becomes suspended in the atmosphere in minute particles, with apparently the sole object of causing irregularities in various operations, but especially those of the photographer.

Mr. M. Carey Lea's remarks in our last number come opportunely as a reminder at a time when many of our readers are probably thinking of commencing their preparations for the coming season; and just now, before things have been got into order, a good opportunity occurs of putting into practice any modifications in our dark room or other arrangements which may have been suggested by the results of recent researches in connection with spots and dust. But it unfortunately happens that, though the evil is so common and so apparently simple, the remedy—at least a perfect one—is by no means easily found; and whatever efforts we may make to circumvent the foe it can only palliate, not cure. However, knowing what we have to contend against, our attention must be given fully to the subject; and, forewarned, let us be forearmed to grapple with the foe to the best of our ability.

It is in the dark room itself where the greatest care is most urgently needed, for the injury performed there by dust is not only of such a character as to be subsequently irremediable, but it makes itself known in the most aggravated form. Moreover, as has been pointed out by several writers in our columns, it is in the dark room that the greatest liability to the formation of dust exists—chemical dust, active and dangerous. With regard to dry-plate spots, however, we are not inclined to hold the latter description of dust so blameworthy as do some other writers—notably, Mr. Carey Lea. In the course of our experiments a few months back in connection with the formation of spots (artificially we may call it) by the application to the film of various chemical substances in extremely fine powder, we found that the most common types usually met with in ordinary practice were invariably formed by comparatively innocuous substances; that such active agents as hypo., soluble bromides, silver nitrate, and pyro. gave peculiar and exaggerated markings of a character fortunately very rare in actual practice. The effects produced by all the substances named would be more correctly described as "patches" than as spots, being irregular and ill defined in outline, and covering sometimes an area nearly as large as a sixpence. The hypo. markings were invariably visible before development, and frequently before moistening the film. It is true that the particles of matter we employed were possibly not so fine as those to be found floating in the atmosphere, but we draw our deductions from the fact that the markings produced were entirely different in character from those common to dry plates—a distinction which could scarcely be produced by mere difference in the state of division. We are inclined to agree with the opinion expressed by Mr. Warnerke—the first who ever attempted to explain the cause of washed emulsion spots—that particles of organic matter are, if not the most active, at least the most common source of the evil, as it was by this means we were able to most nearly imitate the "real article." Still we cannot lose sight of the assistance which chemical agents are capable of lending to the formation of organic dust; the corroding or rotting action of the chemicals upon wood-work, cloths, or other organic substance which may find a place in the laboratory, tend to aid their disintegration, and help to load the atmosphere with particles of matter which would be infinitely better elsewhere. It is quite possible that nitrate of silver (to take a single instance) may give a very different description of spot, if it find its way on to a film in its pure state, to that produced by a particle of matter abraded from a silver-stained developing table, or a minute filament shaken from a duster impregnated with the same salt.

The precautionary measures which we have to adopt are of two distinct classes—the first aiming at reducing the chances of the *formation* of dust to a minimum; the second rendering it, when formed, as harmless as possible. Presuming that the dark room is confined to its legitimate uses, the liability to dust from ordinary causes is small in comparison to a room which is in constant occupation, and in which a variety of operations are carried on. But the spilling of solutions, the scattering of small quantities of solid substances, and the other *etceteras* of chemical manipulation, introduce a fresh danger, of which we have already spoken.

Now, the remedies for this evil are simple enough in theory. "Never spill a drop of solution," says one writer; "let floors and shelves be frequently and carefully washed," says another; but surely to carry out these recommendations in their entirety would occupy the greater part of a photographer's time, and render his life a burden to him. With regard to the spilling of solutions or crystals upon the floor, or, more commonly, upon the work table, no doubt much greater care might be exercised; but, granting the exercise of every possible care, a single unavoidable accident would counteract the efforts of months. Then, as regards washing—be it frequent or otherwise, setting on one side the necessary inconvenience, the upsetting of all arrangements, including the removal of bottles and all the paraphernalia of a photographic room—it is doubtful if the remedy be anything but a very temporary one. The operation of scrubbing the floor and shelves rubs out from the interstices of the wood innumerable particles of dust which have escaped the action of the broom, and these, together with freshly-abraded matter, remain, in great part, in the condition of a thin layer of *mud*—harmless while damp, but actively dangerous as soon as dry. The only way to thoroughly get rid of the dirt altogether is by copious flooding with water, which, it is needless to say, is an impossibility in most studios.

Wood-work is no doubt the most dangerous material we could employ, but, unfortunately, the exigencies of modern civilisation compel us to its use. For the tops of tables and for shelves, however, we might with advantage replace it with slate, which may be now obtained in slabs of varying thickness at a comparatively small expense, and which offer the greatest possible facilities for cleanliness and freedom from dust. The floor presents a greater difficulty. Although the system of laying it with asphalte may be practicable in connection with a professional studio, we imagine that few amateurs are so situated as to be able to adopt it in their laboratories, so we must search for an efficient substitute. We need not go far, however, for a covering, as waterproof baize or oil cloth, if properly laid down, will be found to answer the purpose very well. It entirely protects the wood-work, and when washed presents no grain or hollows to hold the moistened dust particles, which may thus be entirely removed.

The work-table as well as all shelves should on no account consist of bare wood. A good coat of paint effectually prevents the absorption of liquids, and renders the removal of dirt by washing quite easy; but many of the solutions in general use will be found capable of destroying or removing it. Shellac and other varnishes are liable to the same objection; but black varnish or Brunswick black are free from it. The sombre appearance may be somewhat unsightly, but we do not think that should weigh against its efficiency. Perhaps the best plan of all consists in giving the wood-work a thorough coating (or two or three thin ones) of bees'-wax, or, better still, from an economical point of view, paraffine. The wax may be applied in solution, and allowed to soak into the pores of the wood, or it may be laid on by friction with a lump of the substance; in either case, if the operation be properly performed, the woodwork will present a surface quite impervious to aqueous solutions, and but slightly affected by ether, alcohol, or even by acids, and may be washed with the greatest ease perfectly free from all foreign matter. It may be renewed periodically with very little trouble.

When it is possible to so arrange matters, all shelves where bottles or apparatus are stored should be placed at a distance from the table at which plates are coated or set to dry. By adopting this plan, any slight dust which may arise from the removal of a bottle from the shelf will have less chance of reaching the films. The drying closet also should be placed in such a position as to be exposed as little as possible to atmospheric disturbances, or dust will be drawn into it with the current of fresh air. Mr. Carey Lea's suggestion as to the use of glycerine in connection with the drying box is likely to be useful, and reminds us of a similar contrivance we saw some years ago fitted to a drying-box which worked with a current of air. The orifice by which the air-current was admitted was fitted with a framework a little larger than the opening, in which, at intervals of half-an-inch, were fixed diaphragms of perforated zinc; these latter were smeared on both sides with treacle, and the quantity of dust adherent to the zinc after the current had been in operation for an hour or two was really surprising.

For the rest, every precaution having been taken to prevent the formation of dust, we have only to take care not to disturb the small quantity which must inevitably find its way into the room. Several hours should always be permitted to elapse before using the workroom after any cleaning operations, in order that the dust may have time to settle. No plate-cleaning or polishing should be carried on in the same room in which plates are coated; nor should tripoli, chalk, or other powder on any account be used for that purpose, as it is almost impossible to remove the last traces of the powder. We would not even allow a duster a place in the dark room; a *damp* cloth may be kept for wiping up any solutions which may be spilled, and this should be at once washed and wrung out after use. Even the shaking up of a bottle of emulsion had better be performed outside to avoid agitating the atmosphere.

PRINTING SURFACES.

When, on Monday evening last, we saw the deft manner in which Mr. Thomas Bolas, F.C.S., illustrated his lecture—one of the Cantor series—at the House of the Society of Arts, we could not help wishing that the large and highly-appreciative audience had contained more of the photographic element. The lecture was, as we have said, one of the Cantor series periodically delivered before the Society of Arts, and the subject of this special discourse was the production of surface blocks by means of photography.

This is a department of photographic work to which a peculiarly intense interest attaches, if we are to judge of this from the great mass of correspondence which followed the publication of a few chapters on this subject in our Almanac for 1876. Indeed, the correspondence inaugurated by the publication of those articles is still in force.

Mr. Bolas explained in a very happy manner the general characteristics of each process to be described; then followed a detailed technical description of the process and the reactions consequent thereupon; this, in turn, being succeeded by a demonstration in detail of how each part of the process was accomplished—the lecturer adopting the best method of illustrating this, namely doing it in the presence of his audience, the results being in every instance handed round for inspection.

Our object in directing attention to this matter at present is to make a remark or two on one phase intimately associated with the production of surface blocks by the electrotype process—we allude to the best method of rendering the surface of the gelatine relief one upon which copper may be deposited in the best, quickest, and simplest manner. We have referred to an article in a previous Almanac. It is there stated (page 24, 1876) that the surface of a gelatine relief may be rendered "conducting" by means of plumbago or bronze powder, or by the precipitation of silver upon it through the agency of an application of the nitrate of that metal, followed either by exposure to light and subsequent treatment with pyrogallic acid, or by its subjection to the well-known reducing action of phosphorus.

Photography makes rapid advances: since the statement in the Almanac alluded to in the preceding paragraph was written the physical condition of bronze powder has also been making rapid progress. This powder, we may state, forms an electrical conductor better, as we have proved it to be, than plumbago. This reduction of silver, to serve the same purpose, has in our hands been quite successful; but it has demanded the exercise of much patience, knowledge, and skill in effecting its uniform reduction over the surface of a gelatine relief. Till a recent period it was a matter of indifference whether we should avail ourselves of the conductivity of plumbago or of bronze when trying competitive experiments with silver reduced in the manner at which we have already hinted; but, owing to recent improvements in the manufacture of bronze powder, we have now no hesitation in recommending this as the best method for rendering a gelatine relief picture a conductor of electricity. The objections which in this Journal have been suggested against bronze powder as contrasted with the more finely-atomised plumbago (or reduced silver) arose out of the coarseness of the former as compared with the latter. With much gratification we are now enabled to say that such objection no longer holds good. From Mr. Richard J. Allen, the manufacturer of the well-known Bessemer bronze powders, we have received samples of the latest productions in this direction, which are as much superior to what on Monday evening was exhibited, in its effects, by Mr. Bolas as *that* was superior to plumbago. The supreme degree of fineness, as regards impalpability, to which this has now been brought may be deduced when we say that the mere application of a little of the powder to the nail of the finger will, with slight friction, suffice to give the nail surface a coating of the bronze powder so fine and yet so continuous as under a magnifying glass to present an unbroken metallic film without obliterating any of the details of the surface.

The application of this will be obvious. When by means of one or other of the processes which have already been often described, and to which we do not here further allude, a gelatine picture has been obtained in relief or in heights and hollows, it only suffices that after the removal of the surface moisture by means of blotting-paper the fine bronze powder be applied by a camel's-hair brush. The physical condition of the bronze powder now within reach of all is such as to render quite easy the obtaining of metallic or electrotype casts from surfaces the details in which are almost microscopic.

A NEW METHOD OF TESTING SILVER SOLUTIONS.

A new mode of determining the amount of silver present in a liquid by volumetric analysis has recently been published in a scientific contemporary, and as it requires neither apparatus or chemicals that may not be found in many photographers' studios we hasten to place it before our readers in a form suitable for photographic use.

The method, which is simple, easy, and, withal, very delicate—its publication being due to Mr. J. Volhard—is based upon the reaction of sulphocyanide of potassium, ammonia, &c., with persalt of iron—one of the most delicate tests known to chemists. It is so delicate that if a single drop of iron developer, well oxidised (say) by nitric acid, were placed in a good-sized test tube and then filled up with water, emptied, and again filled up with water, a very perceptible coloration would be produced upon the addition of a solution of a sulphocyanide. In large quantity, though still minute, a deep blood-red coloration is instantly formed.

The alkaline sulphocyanides, as is well known, possess such solvent powers as to have enabled them to be proposed as a substitute for the old familiar hypo. in fixing paper prints. It also throws down from silver solutions the sulphocyanide of silver; and, if a persalt of iron, which does not possess a precipitating or developing action with silver, be added to the silver solution, a typical red coloration is not permanently seen till all the silver is thrown down as sulphocyanide, the iron here playing the part of an indicator. It follows, therefore, that we may make a solution of sulphocyanide of a definite strength and use it to tell the amount of silver present in a solution by the aid of a simple calculation.

Sulphocyanide of ammonia has been recommended, but care must be taken to select a sample free from chlorine—a contamination oftenest seen in the ammonia salt. The quantity of this salt required to throw down one grain of silver is seven-tenths of a grain, or, to be accurate, the true proportion is 1000 : 704.

In the paper by Mr. Volhard it is recommended, for the purpose of obtaining a sulphocyanide solution rigidly exact in strength, that a certain quantity of metallic silver be weighed and carefully dissolved in nitric acid, then well boiled, and after cooling a small quantity of ammonia-iron alum added. This solution is then used to test the strength of the sulphocyanide solution. For analysis, when the utmost delicacy is required, such precautions are highly desirable, and if a large quantity of silver solution had to be tested for purposes of estimating its value to a nicety, such delicacy would be necessary, but for the ordinary purposes of bath testing it will be quite enough to use pure and carefully-selected sulphocyanide of ammonium well dried, and dissolve at once the quantity found requisite by calculation according to the scale used. There are two methods in common use by photographers for testing the strength by precipitation, *i.e.*, neither more nor less than volumetric analysis—one in which a measured quantity is put into a bottle and thrown down with a standard solution measured by drachms; the other, and the better one, in which the silver solution is placed in a graduated tube and the precipitator added till the silver is all thrown down. The height the liquid then stands in the tube is read off at once from the tube as so many grains per ounce.

Taking, in the first instance, the latter as our standard we may calculate from a drachm of the solution to be tested; placed in the tube, the level of its surface is marked zero. So much of the space above as would hold one fluid ounce is divided into one hundred divisions. Hence, if the drachm of silver solution took the whole ounce of precipitator, it would indicate that it was of the strength of one hundred grains to the ounce, and, as the drachm is one-eighth part of an ounce, it would contain one-eighth of one hundred, or twelve and a-half grains of nitrate of silver. All that is to be done, then, is to make a solution of sulphocyanide, one ounce of which will throw down twelve and a-half grains of silver nitrate. We have already said that 704 grains would throw down 1,000 of silver, which would be contained in 1,577 grains of nitrate of silver. We thus get the proportion—

$$1577 : 704 : 12\tfrac{1}{2} :: 5{\cdot}58;$$

i.e., 5·58 grains of sulphocyanide of ammonium are to be di[sol]ved in one ounce of water so as to make the required precipitating [sol]ution.

It will, of course, be more convenient to make a larger quantity, and so avoid fractions of a grain. This must be tried with a carefully-made test solution of nitrate of silver, and if it fall short in the estimate of strength it gives it can be easily rectified by adding a proportionate quantity of fresh sulphocyanide out of the same supply. Thus, taking a solution known to be thirty grains to the ounce, if shown as twenty-seven grains it would require an addition of $\frac{27}{30}\cdot3$, or $\frac{1}{9}$ in quantity more sulphocyanide than is already in the solution.

The proportion of the ammonia-iron alum to be added before testing is two and a-half per cent. of a cold saturated solution; allowance must be made for this in graduating the tube. The sulphocyanide solution is then added a little at a time. To employ Mr. Volhard's words:—"At first a white precipitate is produced, which remains suspended in the liquid like silver chloride, rendering it milky. On the further addition of the sulphocyanide each drop produces a blood-red cloud, which quickly disappears on agitation. As the point of saturation is reached the silver sulphocyanide collects in flocks, and the liquid grows clearer, without becoming perfectly limpid, as long as a trace of silver remains in solution. As soon as all the silver is precipitated the flocculent precipitate quickly deposits, and the supernatant liquid becomes quite clear." [The latter effect is just the reverse if the precipitation be by chloride of sodium, in which, as pointed out by Mr. G. Watmough Webster in our columns some time since, the liquid, when the precipitate subsides a little, is limpid till all the silver is thrown down, when it suddenly assumes a milky aspect which no shaking serves to dispel.]

Mr. Volhard continues as follows:—"The sulphocyanide solution is added by drops till this point is attained and till a very faint light-brown colour appears in the liquid, which does not vanish on repeated agitation. The colour is most easily perceived if the liquid be held, not up to the light, but against a white wall turned away from the window."

It only remains to be said that the new solution will keep for at least two years without decomposing; the presence of nitric acid does not at all interfere with the reaction, neither does cadmium, which, in the form of nitrate, would be found in the dipping baths. Nitrous acid and heat are the two points to be guarded against; they cause the striking colour to be entirely destroyed.

There is no part of the preparation of a dry plate which is at once such a comfort when properly performed, and such a nuisance in its performance, as the application of a preliminary coating or substratum, and it is very much open to question whether the advantage gained is commensurate with the trouble incurred. Albumen—the substance most generally employed—is troublesome in preparation if a perfectly-clear film be desired, while the length of time required in drying renders it extremely liable to attract particles of dust, which afterwards adhere obstinately to the dried surface. Add to this the fact that under alkaline development, especially if strong, the substratum gives way, forming blisters, or, in very bad cases, loosening the whole film and acting in a directly opposite direction to that desired. India-rubber is free from these objections, but presents another and, perhaps, more serious one—the liability to cracking from unequal expansion after coating with collodion. This defect may not make itself evident at first—may not appear, in fact, for months; but it is the uncertainty and treachery of its behaviour which render it the more dangerous. Other agents have not come sufficiently into use to require mention, but we wish to bring forward the value of one which, though not new, has at least claims to novelty as a dry-plate substratum, and appears to answer the purpose perfectly. We refer to wax, which has long been employed in certain branches of photography as a preliminary coating to glass before collodionising, and possesses the opposite properties of rendering the film adhesive to the glass while wet, but easily removable after desiccation. We have lately been employing it, in connection with dry plates by dissolving it in ether or chloroform to the consistency of paste. A little dab of the paste is placed on the glass and smeared over with a piece of cotton wool, and afterwards polished off with a silk rubber until no *apparent* traces remain. For small plates this is is all that is necessary, while large ones only require the addition of an edging of india-rubber. Its advantages are extreme ease of application, non-liability to dust, the formation of an artificial surface equal to the most perfectly-cleaned glass with very little trouble, and, finally, it greatly facilitates the subsequent transfer of the film, if desired.

STUDIO BUILDING.

A correspondent asks, in the issue of this Journal for the 8th ult., for some information relative to a new studio he wishes to build; and, as his wants have met with only a single response, I have jotted down a few hints for him, from which may possibly be gathered matter useful to other readers, as the experience I have gained in building three or four studios has made me familiar with many aspects of the subject. In The British Journal of Photography, November 19, 1875, I gave particulars of my own studio, with some explanation of the motives actuating me in selecting certain constructive details. I would refer Mr. Hamilton to that for additional information beyond what is here given.

Mr. Cowell, in the last number of this Journal, strange to say, has given what I may term almost an exact plan, even to its dimensions, of my own studio, which was built under more difficult surroundings than Mr. Hamilton describes; a reference to my diagram on page 555 as above will show this. I consider no advantage whatever would be gained by the single long sash without any vertical side lights such as Mr. Hamilton speaks of. I think it would be no cheaper; it certainly would not possess any advantages for illuminating the sitters, and it has the grave drawback of lessening the available space for groups. It also is sadly in the way when moving the backgrounds, all of mine, with the exception of the permanent one that is strained over the end wall of the room, being made movable on castors. This plan has many merits, not the least being the facility with which the background can be made darker or lighter by moving it sideways to or from the light. One of these screens, eight feet high, cannot be brought within a foot or two of the low side, and the window panes are always in danger of having a corner of the background poked through them. I would advise the room to be symmetrically built; that is, each side wall the same height, though a steeper pitch may be given to the north roof so as better to keep out the sun. I also gave a plan for calculating the position of the ridge to carry out that purpose.

Let Mr. Hamilton, after deciding finally on the dimensions of the studio, draw on a base line the walls as part of a section of his building, and run from one end of the line—the north end—a line making an angle with the wall estimated by subtracting 12° (not 23½°, as by an accident in a former article I am made to recommend) from the *latitude* of his studio. If the ridge fall anywhere on that line or to the north of it no sun will enter the studio. If that indicate a pitch that does not satisfy him he can make the ridge more to the south of the line, and place louvre boards, as suggested by Mr. Cowell, to keep the sun out of the studio. Much comfort will also be obtained by using the arrangement of louvre boards I described, at the west end also, to keep out the afternoon sun during the summer months.

The necessities of the position require this studio to run east and west, and the main deckground end should be the west, as, if reversed, the sitter would almost face the sun in the after part of the day—an arrangement to be avoided as much as possible. In my own studio, as I have before stated, I have light in the south side as well as the north, which is well protected from sun, when not required, by the thick blinds I use. I consider the power of using a south light to be invaluable; I would not be without it. It will not be necessary to have so extensive a surface glazed as on the north, on account of the difficulty of entirely keeping down the effect of the sun's heat. The large surface I originally devised has been lessened considerably by covering it over permanently with boards till the glazed space was diminished one-half. In summer time it is still further protected by a covering of louvre boards, with each board set at a different angle, so that from one particular point in the studio (at the west end) nothing but their edges can be seen, while from the other end nothing but boards is seen; and, consequently, after the sun passes the meridian very little sun is admitted, even when the blinds are all drawn aside. This, of course, precludes the south light being used when the sitter is at the east end of the room; but, practically, it is not needed with a double-lighted room such as I describe.

My glazing ceases at five feet from the background end of the room; and it is an advantage for it to d [illegible], as it gives more play for the screens. It is unfortunate for Mr. Hamilton that his east end is so high instead of his west. He should stand in a supposed sitter's place at the west end, and, looking through his roof all round him, mark off any part of it through which the sky is obstructed by buildings. In the marked-off portion he will find a gain in light if he put there obscured glass instead of clear.

I have had no experience of blue glass, but I know it diminishes the light and so increases the exposure. I believe Mr. W. Keith, of Liverpool, has a studio wholly glazed with it. This glass is, or was, to be obtained from Messrs. J. A. Forrest and Co.

If a greater length than thirty feet is obtainable it is quite worth while to get it, as plenty of distance is often very useful when taking large groups. The question of the material to cover the opaque part of the roof with is, to some extent, mixed up with that of ventilation, which is referred to in the number I have named, and also a little earlier in the same volume by Mr. J. W. Gough, in an article devoted to the subject. The roof may be covered either with slate, asphalte, felt roofing, or metal, such as zinc or lead. As keeping out the heat in summer and wet in winter are the great objects, I say in no case use the felting. It is not much cheaper when the labour of coating it occasionally with tar and sand is considered. Slates are good but heavy. The unglazed half of my studio is slated, and the five feet of opaque at the background end is covered with sheet zinc, the use of which entails the utmost care and watchfulness to see that every nail-hole is made secure from leakage, and this I was not able to get done without having every nail soldered. It is astonishing what a quantity of water will penetrate through the smallest of holes on a roof.

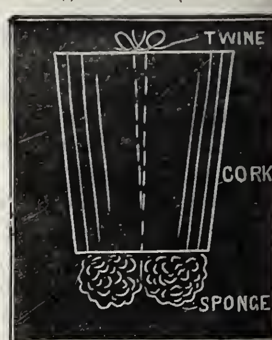
I think the above will be a fairly succinct summary of most of the leading points referred to in Mr. Hamilton's request, but if there be any further information I can give I shall be happy to communicate it.

G. Watmough Webster, F.C.S.

EDGING PLATES.

I have seen and read of many dodges for edging plates with india-rubber, &c., &c.; and, although some are very good and ingenious, still I do not know that I have ever seen any better or simpler than the one I adopt.

Procure a one-ounce, wide-mouthed bottle and a good long cork to fit it; now pierce the cork through its length twice (or in two places) with a stocking-needle, leaving about a quarter of an inch of space between the two holes. Put through them a piece of twine, forming a loop at the small end of the cork, and through this loop place a small piece of sponge not bigger than a marble, when by pulling the twine tight the sponge is held fast against the end of the cork. (See annexed diagram.)



The cork can be put into the bottle after use. The sponge being kept inside is always clean, soft, and ready for use, and by being fast to the cork forms an excellent guide, for the width of the edging depends upon the size of the piece of sponge.

W. J. Chadwick.

THE MODERN MAGIC LANTERN.

[A communication to the Manchester Photographic Society.]

This instrument—still best known by its old, unscientific title—has, I think, in no part of the world been more used and experimented upon than in my own native town of Manchester, and therefore I consider it the most fit place to make a few remarks on those in present use. In order that all honour be given to the person to whose researches we owe our present compact and powerful oil lanterns, I wish it to be more widely known that the honour belongs to Mr. Marcy, of Philadelphia, who spent many years in working out and completing what he very appropriately named the sciopticon.

The instrument itself requires no description to members of this Society, as I believe they nearly all possess one—its chief features, as you know, being a narrow double flame, placed edgeways to the condenser, and its very compact body, which does not much exceed the latter in diameter.

Now, next to inventing something useful myself, there is nothing gives me greater pleasure than to introduce a foreign invention which I think may prove of use to my fellow-countrymen; therefore, when in America some six years ago, and seeing the advantages of Marcy's invention over the clumsy ill-lit things we were using, I determined to introduce it into this country on my return, and arranged with Mr. Marcy accordingly.

As I expected, the instrument became a great favourite with the scientific public, and no greater proof of its value could be shown than in the number of imitations that have sprung up, more or less copied from it. Among others we have the euphaneron, the lucidus lantern, the eureka lantern, the excelsior lantern, Steward's lantern, Jones's lantern, and, in fact, anybody's lantern who chooses to order a sufficient number, and have his own brass plate attached. Those I have just enumerated are all manufactured by the gross and by the same firm, and, with the exception of the title-plate, are identical.

One departure from the Marcy form of wick is found in these, viz., that of dividing it at one end, which I think to be a mistake, as it nullifies the chief feature in the sciopticon, and is really bringing us partly back to the old circular or broad wick, besides other disadvantages. On my return from America I tried a variety of forms of wicks as well as the triple, but came to the conclusion that no improvement was effected.

There are also new forms of lanterns in the market, but on examination they will all be found to have some parts copied from Marcy's sciopticon. Among other illuminating powers (oxyhydrogen always holding the foremost place), we have a small lamp which the reader (Mr. W. J. Chadwick) will introduce to you, and which I have styled the "pyro-hydrogen lamp," the history of which it will be as well to lay before you.

As far back as the year 1828, in the records of a celebrated patent case, occurs the following:—Alderson, B., said—"The blowing apparatus was perfectly well known, the heating of air was well known, the tuyere was well known as applicable to blast furnaces; then what he really discovered is that it would be better to apply air heated to red heat, or nearly so, instead of cold air. That is the principle—that is the real discovery." Here, I suppose, we have the first mention of the principle which has since been applied to hot-blast blowpipes.

The first attempts that were made, as far as I can learn, to apply this principle to lighting purposes took place some seven or eight years ago, and chiefly among the members of this Society. A number of experiments were tried by Messrs. M. Noton, Webster, Fletcher, Pumphrey, Winstanley, and others. Whether these gentlemen aimed too high, or that the matter proved a failure, certain it is that for seven years it remained in *statu quo;* and when upon applying to Mr. Fletcher, of Warrington, early last year, to manufacture for me the particular form of apparatus you see here tonight, he assured me that the system had been tried by himself and others and had entirely failed, at the same time trying to dissuade me from going on with its manufacture.

The lamp before you is of German invention, having been somewhat modified by myself for lantern use. With a steady pressure of air, which I find is best obtained by turning the water pressure into a large barrel or other convenient vessel, and taking the air from a small tap at the top the light burns steadily all the evening, the lime being hardly affected, and, if put away in an air-tight case, may be used for months.

I will say nothing of its "candle power"—that I will leave to those who choose to test it; for since the introduction of those two words in connection with magic lanterns they have become so common that thousands of candles are advertised with the greatest recklessness, and without stating how many are lighted, or whether they are not the small ones in use to adorn Christmas trees.

Walter B. Woodbury.

NOTES ON OXYGEN MAKING.

There is much truth in the adage, "familiarity breeds contempt;" and it is well that it should be so, as, were it not for that, there are many occupations of such a dangerous nature that it would be difficult to find men willing to undertake them. But while this becoming accustomed to danger is so far good, it is quite possible to overdo it and neglect simple precautions, thereby converting what would otherwise be safe operations into work which is so frequently followed by disaster and death. This fact is abundantly proved by the frequent explosions permitted to occur in the production of oxygen from potassium chlorate and manganese dioxide. It is well known that, so long as the material is pure and the tubes clear, the operation may be carried on with perfect safety; but when the manganese has been, either by accident or design, mixed with carbon in one or other of its various forms, it results in the formation of carbonic acid in such volume as to make an explosion inevitable. How carbon finds its way into manganese dioxide is difficult to understand, the price of the latter being such as to put intentional adulteration out of the question. The fact is, nevertheless, patent that it is not unfrequently present; and, as a simple and ready means of discovering it has been again and again pressed on the attention of those interested, it seems little short of a crime to neglect it.

There is no better or readier method of ascertaining the safety or otherwise of the mixture about to be used than the one I published in this Journal more than a dozen years ago, which was this:—On getting a fresh stock of manganese mix a few grains of it with the suitable proportion of the chlorate, place the mixture in a test tube, and hold it over a gas or lamp flame. If the material be sufficiently pure the salt will be decomposed and the gas pass quietly off. There may be seen a few bright sparks of light playing on the surface of the mixture, arising probably from the presence of minute traces of carbonaceous matter, but they are of no consequence. Should, however, there be carbon present in sufficient quantity to cause an explosion, as soon as decomposition has fairly commenced the contents of the tube will be projected in the form of flame and incandescent particles like the burning of a squib, but much more violently. I need hardly say that the mouth of the tube must be turned away from the operator, and if that be attended to there is not the slightest danger in the application of the test.

While carbon is the general source of danger in the production of oxygen, much more dangerous substances are occasionally met with, and readers of this Journal will remember an instance that occurred in Leven, in which sulphide of antimony had been supplied instead of manganese; but the above test is applicable to this, or indeed to any other, substance from which an explosion can arise.

In a recent article on this subject the Editors directed attention to a hitherto little-suspected source of explosion, viz., the alleged fact that a drop of the oil that had been applied to the screw of the mercury-bottle form of retort might fall into the heated mixture and lead to the liberation of olefiant gas. No doubt if such were the case a serious accident might occur, as olefiant gas mixed with three times its volume of oxygen explodes with great violence; but the Editors will not be very angry if I say to those who still use that obsolete and unsuitable form of retort that they may keep their minds at rest, as the temperature required for the decomposition of the salt is far too low to break up the oil, and every trace of oxygen would be off long before an atom of olefiant gas could be produced. I am aware that the late Alexander Bryson, of Edinburgh—no mean authority on such matters—at a meeting of the Royal Scottish Society of Arts, attributed an explosion that occurred in his house to that cause; but he soon afterwards saw reason to change his opinion, as the tube, which is still in my possession, was found completely choked. It had been filled with metal to enable a suitable bend to be made, and that metal remains there to this day.

Of course all this has been stated before, but some things require to be repeated again and again before those especially interested can be induced to give them their attention, as a case that occured here a few days ago clearly shows. A well-known member of the Edinburgh Photographic Society—who has for many years been in the habit of making oxygen for lantern purposes, and who, according to his own account, had never had an explosion, and did not think he was likely to have one—sent for the usual supply of material and placed about a pound and a-half in a new conical sheet iron retort. This was placed on an open fire in a grate or stove, and in a few minutes an explosion occurred, tearing the retort as if it had been cardboard, wrenching the exit tube completely off at the junction with the cover, breaking the grate into fragments, throwing himself violently against the opposite wall of the room, and also smashing the glass in the window. Now all this would have been prevented by the application of the above simple test, as on examining the manganese it was found to contain over twenty per cent. of coal dust.

In the ordinary manufacture of oxygen, especially when the convenient Bunsen burner is the source of heat, I have reason to believe that many operators do not get the full quantity of gas the salt contains. Experience shows that, practically, a pound of the chlorate will yield about 4.3 feet, but I know that too often much less is obtained. Shortly after the flame is applied the oxygen begins to come off—slowly at first, but in a minute or so very rapidly—and continues to do so for some minutes. Gradually it decreases in rapidity, and by and by comes only in single bubbles. If the heat be continued, and especially if a little increased, the gas will in a few minutes again come off as rapidly as at first, continue for a longer time to do so, and return to single bubbles, or perhaps stop altogether. Now if at this stage the heat be withdrawn, the tubes disconnected, and the retort allowed to cool and then opened and inverted, a considerable quantity of undecomposed crystals will fall out mixed with a large proportion of manganese; and, as the usual method is to pour water into the heated retort to dissolve the chloride residue, this undecomposed chlorate is, of course, lost. The heat, therefore, should be continued, and it will be found that, in most cases at least, a third liberation of oxygen will take place. No doubt the difficulty of getting off the full quantity of oxygen arises to a great extent from too large a quantity of the mixture having been put into the retort, the heat which plays only on the bottom being insufficient to decompose the upper layer. The ordinary form of retort is also faulty; it would be much improved by being at least one-half wider at the base.

My attention was particularly directed to this subject a short time ago, on being consulted by the manager of a large theatre, who employed from eight to twenty lime lights in certain scenes in a pantomime. The oxygen was passed direct from the retort into a large iron tank, from which, under suitable water pressure, it was supplied to the burners; but the consumption was so great that the retort had to be kept constantly at work during most of the evening to keep up the supply. The retort, which was of thin boiler plate, was suspended from the roof of the tank house by a chain immediately over a rose Bunsen burner, the flame of which was large enough to cover the bottom and come well up the sides. The stock of "oxygen mixture" was kept in packets of five pounds each—four of chlorate and one of manganese—and the charge was one such packet. This should have given at least over seventeen feet of gas, but as I saw the operation carried on the product was not much more than half that quantity. This great loss was not discovered, as to save time the moment the heat was removed water was poured in to dissolve the supposed residue, and enable the gas-man to start another batch. I recommended the reduction of the charge to one-half, and I understand that they now get as much oxygen at each operation as before, and that it comes off in less than half the time previously required.

Acting on a hint given by the Editors in the article already alluded to, I have gone pretty fully into the question of the advantages likely to be derived from the substitution of some inert material for the manganese, and am forced to the conclusion that the action of the latter is more than simply mechanical. The experiments were made in a hard glass tube, one gramme of potassium chlorate being employed in each, and the heat—that of a small Bunsen burner—was the same in all cases. The chlorate, without admixture of any kind, commenced to fuse at the end of one minute, and shortly after bubbles of gas came off, the fused mass spurting a good deal half way up the tube. At the end of four minutes seventy cubic centimetres of oxygen had been collected, and it continued to come off slowly; but the tube showed indications of being about to fuse, and the flame was withdrawn. When the tube had cooled the residuum was very hard and dissolved with difficulty, so that the process of emptying a retort would be troublesome.

In the next experiment the chlorate was intimately mixed with a nearly pure silica in the shape of the beautiful white Fontainbleau sand used in the manufacture of the finer varieties of flint glass. Within thirty seconds after the application of heat the mass acquired a pasty consistence, and rapidly swelled till the tube was half full. When the gas began to come off there appeared a number of beautiful scintillations, showing the presence of carbonaceous matter in small quantity. It stopped when 160 c.c. had been collected, and no more could be got until the lapse of four minutes, at which time the glass had passed into a bright red, and was beginning to bulge.

In the third experiment ordinary river sand was used, and although the result was better it was not satisfactory. The objectionable swelling up did not take place, but the salt seemed to separate from the sand, collecting at the bottom of the tube, and behaving not unlike the fused chlorate in the first experiment, and ceasing to give up gas when 240 c.c. had come over.

In the last experiment the usual manganese was mixed with the chlorate, and the result was in every way satisfactory. The oxygen began to come off about twenty seconds after the heat had been applied, and continued steadily to do so for two minutes, at which time the receiver showed 300 c.c. The mass did not pass beyond a pasty state; it did not appreciably increase in bulk, and the salt may be presumed to have been completely decomposed, as it stopped at that stage and did not again appear, although the heat was applied till the tube actually fused.

From the foregoing experiments I suppose—at least, until we get more light on the subject—we must hold that oxygen makers are shut up to manganese, with all its liabilities to carbonaceous admixture; but, seeing that the dangers from that source are so easily guarded against, it is not a matter for any serious regret. It is just possible, however, that the state of division in which the "inert material" is used may have something to do with its action; but it is difficult to reduce sand to an impalpable state, and the operation would make it much more costly than manganese. Possibly the calcined flints used in the manufacture of pottery, and which can be got in very fine powder, might answer the purpose. I shall, by and by, give that substance a trial, and, should it prove suitable, will inform my readers of the result of the experiment.

John Nicol, Ph.D.

SUB-BROMIDE OF SILVER IN EMULSIONS.

I have read with great pleasure, in the Journal of February 15th, your excellent article on a suggestion given simultaneously by Mr. H. B. Berkeley and by myself. Unhappily my letter has not given the exact impression of my idea, so that I fear you have exaggerated the practical difficulties of the method I advocated.

I used the expression "definite quantity of silver nitrate in excess;" that is to say, that I take precautions at the end of the operations—that is, when all the Ag Br is transferred into Ag_2 Br, and when all organic matter capable of combining with silver has entered into combination—to secure the presence of uncombined silver nitrate in the emulsion in unknown quantities, but in sufficient quantity to be amenable to the testing. The aim of this is to know the effect of operations by the identical results given by successive tests.

How is this final excess of free silver to be obtained? Simply by the calculating of—1. Nitrate of silver necessary in the transformation of all the soluble bromide into silver bromide. 2. Silver nitrate combining with the organic matter; this, of course, is to be guessed at, and cannot be ascertained with precision. 3. The excess of silver, which has to be sufficiently large to allow a certain margin for No. 2. The total of these quantities will be the proportion of silver nitrate necessary to be introduced into the collodion.

You will see, now, that the organic silver compound is formed in presence of the same quantity of silver nitrate in excess in each emulsion, containing different proportions of silver bromide, but formed with the same normal collodion.

I should think it advisable to use a collodion containing but a small proportion of soluble bromide, and, on the contrary, a full amount of water, so as to facilitate the total transformation of Ag Br into Ag_2 Br. But in all cases this end will be obtained (if obtainable at all) only after a long period of time. L. O. Sammann.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

Tea!—blessed, tranquilising beverage, that stimulates our faculties and quickens our perceptions without clouding our intellects!—how shall I sing thy praise in becoming strains? I had been thinking about a photographic friend now far away, and someone, *apropos* of mentioning of his name, had alluded to his devotion to tea as an organifier in dry collodion processes. This suggested the reminiscence of a peculiar warmth of tone that characterised tea-organified negatives, and I concluded that tea, properly used, ought to yield transparencies possessing that rich warmth which constituted one great charm in the albumen transparencies of the late M. Ferrier. Preparing half-a-dozen plates with an emulsion containing excess of bromide, I washed and organified them by means of an infusion of "bohea" so strong as to be almost undrinkable. A short exposure, followed by a prolonged development, completed throughout by alkaline pyro., yielded six exquisite transparencies of a rich, warm tone. I offer this bit of experience as my contribution to the praiseworthy effort now being made to re-clothe the nearly dry bones of stereoscopic pictures.

The mother of one of my numerous friends has kept the eighty-fourth anniversary of her birthday. "Well, what of that?" do you ask? I'll tell you presently. When reading an article on *Exposure* contributed to this Journal a few weeks ago by Mr. W. Harding Warner—an article which, I frankly confess, I do not understand, and hence cannot appreciate—I came across this passage: "if we had much white around us our lives would become unendurable, for we should be in a perpetual glare and our brains be in such a state of activity that our existence would be considerably shortened." Here is the point of the incident I have introduced; the lady to whom I have just made allusion resides in a latitude so high as to cause her surroundings to be "friz" water and snow a great portion of the year. It seems, then, that individuals may have "much white" around them without having their brains excited to such a state of activity as to considerably shorten existence. But does the possession of an active mind abbreviate the period during which mind, or soul, and body are linked in unison? I trow not. The most intense mental activity and ripe old age are perfectly compatible with each other. Brewster was not an intellectual sloth, yet his earthly pilgrimage far exceeded the infrequent "four score." So with many others whom I could mention. Hence Mr. Warner must reconstruct his dogmas. Before I leave this gentleman I must remind him that he opened his article by putting a question which he left unanswered. He asked—"Photographically speaking, what is exposure?" and goes on to aver that "the text-books tell us it is an indefinite something which can only be judged of at the time of taking a picture." This, he says, causes bewilderment to the tyro. Will Mr. Warner permit me to inquire the name or title of any one text-book which gives such a foolish definition as that with which he accredits them all? Mechanically, optically, and chemically speaking, exposure is the act of uncapping a lens so as to allow of the impact of the image of external nature upon the sensitive surface of the plate so as to effect or set up a process of reduction to be completed by the action of the developer. Does Mr. Warner attach any occult or unrevealed significance to this act? I scarcely think he can, seeing he is writing a practical and not a metaphysical article on a practical subject. I trust that this gentleman will give me credit for writing with the desire of obtaining further information.

Mr. W. M. Ayres has it in his power to bestow a great favour upon photographers by imparting a little more information respecting his ingenious method of cutting sensitive paper than it was possible to glean from the editorial article in which that method was described. The kind of information I, and doubtless many others also, desire is a statement as to the various measurements on his guides or gauges. It is quite true that any clever man might find out for himself the best lengths in which to divide the gauges to be made use of in marking the paper; but, as I have already experienced, it takes a long time to do so, and the "waste" pieces may not be of precisely the dimensions that would be desirable. If Mr. Ayres will kindly publish a list of the dimensional values of a few pairs (if not all) of his gauges he will render a great service to others besides the "Peripatetic Photographer."

Observing that the "service medal" of the Photographic Society of Great Britain was bestowed at the last meeting of that body upon Mr. Henry White as an acknowledgment of his services as treasurer, I am led to remark that this bit of Fabian policy comes with a very ill grace so many years after his resignation of the office. Other treasurers have come and gone since Mr. White retired, and, on the assumption that he rendered excellent services while he held office, it would have been a more graceful act had there been less tardy recognition of such services. To be of full value, services of that nature should secure acknowledgment promptly and without allowing a very considerable period to elapse.

It is a good thing that the new American journal, entitled *Photographic Rays of Light*, is only to come out quarterly. Its title is sufficient to render appalling the bare idea of its becoming a weekly serial whose name might have to be pronounced more than once a day. If its proprietor or publisher wish it to thrive let him by all means have it "re-christened" ere its second number sees the light of a new quarter. An old proverb declares that "it is better to hang a dog than give him an ill name," and the same may be said in connection with serial literature.

(To be continued.)

ON GELATINE EMULSION, ORGANIFYING OF COLLODION, AND EASILY-PRODUCED, UNBREAKABLE DRY PLATES.

I made my first experiments with gelatine emulsions last autumn. They are less troublesome and take less time to produce than collodion emulsions, and they are extremely sensitive to light; but their subsequent treatment is less simple and easy than is the case with collodion emulsions. For this reason I fear the professional photographer will not soon take kindly to the gelatine emulsion process.

My experiments led me to a very important result, namely, to the organifying of already-prepared collodion emulsions with gelatine emulsion. My experiments are still only at the first stage (owing to continued ill-health), but they are very promising, especially in respect to increase of sensitiveness and ease of production. The question as to which cotton is most suitable, and all details as to washing of the plates and treating them with preservatives, are wholly excluded from consideration.

The organification proceeds as follows:—Into a slightly-warmed and but barely-fluid gelatine emulsion an equal volume of collodion emulsion is poured, the whole being stirred with a glass rod during the transfusion. The cotton and the bromide of silver contained in the last-named emulsion are thrown off, and after standing for eight or ten hours they form a coating of some consistency, which should then be taken, and, having been pressed between sheets of blotting-paper to remove any moisture present, it should be dissolved in ether and alcohol in the proportions of one gramme to ten cubic centimetres. This solution is sufficient to organify ten times its volume of emulsion collodion. At the same time that the collodion emulsion is thrown off the gelatine emulsion is also precipitated, and remains suspended in the fluid as a viscous, cohesive mass. This may also be diluted with ether and alcohol, and thereby a fluid emulsion be produced which will furnish good and very sensitive dry films, and which may also be employed to organify collodion emulsions.

The viscous gelatine emulsion, after the fluid has been poured off, should be placed in a shallow mortar, and some fifteen or twenty c.c. of ether and alcohol (nine c.c. of ether to seven c.c. of alcohol) poured over it. By warming, accompanied by vigorous stirring with a glass rod, part of it will be dissolved. When the fluid has become saturated pour it off into a special bottle, and add more ether and alcohol. This proceeding is to be repeated until the last remnant of the viscous gelatine emulsion is diluted.

In order to make the conveyance of dry plates easier when going on long excursions, as well as to steer clear of the custom-house regulations as to the carrying or sending of dry plates, I have prepared light and unbreakable dry plates, the simplicity of whose mode of preparation exceeds that of all other methods. As a support for the snesitive film, glass is replaced by sheets of uncoloured gelatine such as are to be had commercially of various thicknesses. These gelatine leaves are placed in a bath of one hundred c.c. of benzine and one gramme of best caoutchouc, and afterwards dried. When about to be prepared with emulsion and also for the subsequent development, the caoutchouc-coated gelatine leaf is laid upon a glass plate of the same size. Three corners of the leaf are covered by small glass triangles (of the same size as the glass corners in the dark slide), which are fastened down upon the supporting sheet of glass by means of wooden clamps. The fourth corner remains free in order to allow the fluids poured upon the negative to run off. The finished negative remains upon the support. To transfer the film to glass would only be a purposeless increase of the number of manipulations, and would also necessitate a different preparation of the gelatine leaves. In order to make them more durable the edges have strips of paper pasted on both sides of them. When thin gelatine leaves are used the negatives may be reversed if desired. If in the course of development flaws should appear on the reverse side of the gelatine from the picture film, being only in the caoutchouc film they may be mended with benzine.

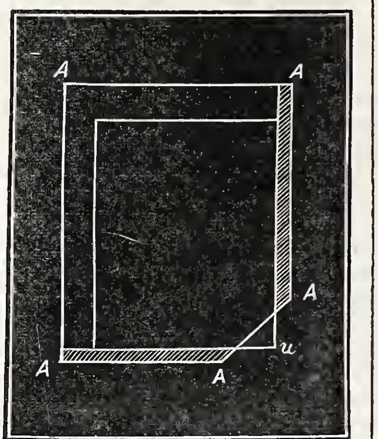
I believe that these leaves might also be used for wet plates, which would be a great advantage when reversible negatives are desired. My experiments on that point have, however, met with interruption for a time, so I recommend it to the consideration of those interested. If any such should try these leaves, it would be a good plan to fasten the edges of the gelatine leaf and the glass plate with strips of thin paper having a coating of india-rubber solution, or with very thin so-called gutta-percha paper.

Albumenised paper, rendered transparent by a mixture of mastic varnish and oil of poppies, placed, after being dried, in a caoutchouc solution gives also a good support for dry films. Gelatine leaves coated with caoutchouc are stored between wax or paraffine paper, and dry plates prepared upon them are stored with the films facing each other, and a sheet of very fine red or yellow tissue paper between each.

The interest of photographers in the emulsion process is very widespread, and it is very well suited to replace all other dry processes and to become generally used. Every photographer who is competent to overcome the difficulties of the wet collodion process will soon overcome those of the emulsion dry process. Every dry plate prepared with bromide of silver collodion emulsion permits a considerable degree of over-exposure without detriment to the negative. In this way faults of exposure may easily be avoided. Authorities amongst photographers, both professional and amateur, have borne witness that upon emulsion dry plates negatives of as great perfection may be produced as upon wet plates. Inattention while working, inexactitude in following the directions given, or other unfavourable outward circumstances are the reasons of failure, just the same as in the case of wet plates. In taking landscapes, architectural views, and interiors, also in reproductions of oil paintings and statuary, or other works of art in museums or art collections, emulsion dry plates may compete* with wet plates, and are often preferable to them.

Still, many photographers who are accustomed to take photographs at a distance from their studios prefer to work with wet plates, in spite of their many inconveniences, because at the time and place of taking the negative they wish to be assured that they have been successful. But the negative upon the emulsion dry plate developes as easily and quickly as that upon a wet plate, and the solutions required for developing are so concentrated that only small quantities require to be taken on a tour. Alkaline development seems to those who have not tried it complicated and inconvenient; but, let them try it a single time, and they will be convinced of its simplicity.

To prepare dry plates and develope negatives upon them I have a little contrivance which I can recommend. In the first place, it allows the plate to be prepared so that no corner remains free. In the second place it saves the hands from permanent stains from the alkaline developer. The way it is used may be seen from the annexed diagram. A A A A A is a glass plate. The shaded parts are strips of glass fixed on with isinglass and bichromate of potassium. Upon this plate the plate, *u*, to be prepared or developed is laid.



The developer given as Mr. Warnerke's, in the last number of the *Mittheilungen*, is the same as the one I have been using and giving out in a printed form along with my dry plates and emulsions for the last nine months. In my version I say add twenty drops of a 1·15 solution of bromide of potassium, while Mr. Warnerke has five drops of a 1·4 solution; thus the quantity of bromide of potassium is the same. For a very sensitive emulsion I always recommend fifty drops of the pyrogallic acid solution and thirty drops of the bromide of potassium solution. [For formulæ see report of meeting of the Berlin Photographic Society, page 91.] Mr. Warnerke omits the fifteen or twenty drops of gelatine solution that I give altogether. Practised hands may do without this addition, but I think it worthy of recommendation to those who are making their first attempts at alkaline development. The development certainly proceeds somewhat slower with it, but very cleanly, and it also helps to give the negative a better covering.

Mr. Warnerke speaks of a very long exposure in the printing-frame. Is that a mistake? In exposing an emulsion dry plate under a negative in a printing-frame I never find a long exposure possible. In such cases I make the emulsion less sensitive by the addition of a few drops of glacial acetic acid and bromine tincture, and then I only expose for a second if I wish to get an unfogged transparency; besides that I must use a much diluted developer, containing a great deal of bromide of potassium solution. [That Mr. Warnerke does also.] In preparing transparencies for enlarging—for which purpose emulsion dry plates, as I have often remarked before, are very suitable—the addition of gelatine to the developer is especially to be recommended. I get the best transparencies by an exposure of from thirty to forty seconds to the flame of an ordinary petroleum lamp. Here I may mention a circumstance that has fallen under my observation, but which I do not know whether others have observed; it is that transparencies printed by contact give far better enlarged negatives than those made by means of the camera, either upon wet or dry plates. The hair and beard, especially, are fine and natural in the first, and in the last remarkably and surprisingly thick. Development with pyrogallic acid always gives more brilliant and transparent transparencies than iron. I shall recur to this point at a future time.

I had always exposed emulsion plates in a dry condition only, until I read the experiment reported in the last number of the *Mittheilungen*, when Mr. Warnerke exposed a plate coated with emulsion, but not dried, and got a picture in a third of the time of exposure required for a wet plate—see page 56 of THE BRITISH JOURNAL OF PHOTOGRAPHY—induced me to try a similar experiment. The result obtained was similar, even when using the less sensitive emulsion which I employ for transparencies. From this last I think that the field for experiment on the sensitiveness of emulsion dry plates is not yet closed. I have had the following experience in that department:—It is not difficult to prepare a very sensitive bromide of silver emulsion. Those that contain a small excess of silver are very sensitive; those that are neutral are less sensitive; and a greater or less excess of bromine lowers the sensitiveness more or less. Those are most sensitive that can be used without chlorine. Unfortunately, dry plates prepared with the last in a short time become untrustworthy and lose their sensitiveness. When absolute certainty of the result becomes a question—as in long and expensive excursions—I think a not too sensitive emulsion is the most suitable; and he who has accustomed himself to a certain routine in the use of alkaline developers will, by modifications in the mixture of the same, be able to develope a good negative, even if he should occasionally find it necessary to give too short an exposure.—*Photographische Mittheilungen.* FR. WILDE.

* Only in certain cases. In spite of all the progress that has been made dry plates do not yet give such certain results as wet plates, and they continually show varying proportions in the tones.—Ed. *Mittheilungen.*

HOW TO EMPLOY PHOTOGRAPHY AND THE LANTERN AS EDUCATIONAL AIDS.

No. IV.

NEXT to the alphabet we must teach the value of the ten fingers we are endowed with—curiously the basis of the decimal system—as if to indicate the proper "natural selection" as regards all worldly calculations. Then, the child should be made to *understand* that the real advantage of mastering the letters of the alphabet and the value of the ten digits is that by simple conjunctions it can specify the names of objects, their quantity, and money value—a practical application which, with a little "tact" on the part of the teacher, may be brought "home" to the mind of even an infant-school pupil. I do not see the necessity for "parroting" over columns of words of one syllable, words of two syllables, three, four, and polysyllables, but go straight to the mark at once by making a child spell the names of such objects of daily wants as bread, cheese, tea, milk, butter, sugar, water, and so on. It is sure to take pride in being able to spell its own name and where it lives—points of practical advantage should the child ever lose its way. The game of "going errands"—"like mother or sister Polly"—is a bit of *Kindergarten* work that has its practical value without the pupil feeling that it is "learning lessons," but matter it takes an interest in. Imagine the pride of a child when it can express on a "movable alphabet" box—"I want a roll, 1d.; cheese, 2d.; butter, 3d."—and that it is thus able to lay out a total of 6d. at "the shop."

The value of MONEY up to one shilling may be readily imparted to a child through "*sight knowledge*" by making toys of four farthings, first showing their equivalent value in the halfpenny and penny; next that twelve copper pennies are of equal value to one silver shilling, six to half a shilling, or one silver sixpence, four to the third of a shilling, or a silver fourpenny-bit, three to the fourth of a shilling, or a threepenny-bit. The value of WEIGHT may be shown by aid of a cube of wood made up of sixteen smaller cubes, so as visibly to represent that one pound is equal to sixteen ounces. Again: one of these smaller cubes is also divisible into sixteen still smaller cubes, to show that one ounce is equal to sixteen drachms. The relation of the BULK of various articles to weight may be placed before the eye by a cube of lead, a cube of cork, a cubical bag of moist sugar; all of which, like the largest cube of wood, weigh exactly one pound. LINEAR MEASURE may be taught in a similar manner by aid of twelve strips of deal one inch long, wherewith to piece out one foot length: others one foot long, to piece out one yard, and so on. The value of the division of TIME may be taught by aid of a large model of a clock face with movable hour, minutes', and seconds' hands.

These examples are only suggestive of how a child may be made to see the practical advantage, *to itself* (self-interest is at the bottom of all human nature), of learning to spell the names *of familiar objects of daily want*, their number and money value, &c., &c.

Next we may approach a higher standard by aid of object lessons, wherein the lantern may begin to play its part. Take, for instance, the familiar object *bread*, which may be visibly represented by the thing itself—a model or its representation on "a slide"—as "a half-quartern of household," "a cottage loaf," "a roll," "a French roll," "muffin," "crumpet," "scone," or "bannock." Explain that all these are made from "flour" mixed with "water" and fermented with "yeast," by which "dough" is produced—the basis of all wheaten bread. Next that "flour" is produced from the "wheat" of the "corn plant" by grinding at the windmill, pictorially illustrated by slides of corn plant, wheat grains, flour, corn-field, reaping, wheat sheaf, carrying home to the windmill, grinding in the mill, with section of a mill, a bakery, &c.; whilst the history of "water" and "yeast" may be treated as fairy tales that will rest long in the imagination of youthful minds if duly illustrated pictorially by the lantern. Cake, pie, and pudding may thus be made to appeal to the brain as well as to the stomach of the infantile pupil. Beef, veal, mutton, pork, ham, bacon, potatoes, greens of various sorts, carrots, turnips, onions, herbs, salt, the local names of the common poisonous plants, or other dangerous objects, &c., all furnish words to spell, about which the teacher can also *tell* something, and show some pictures which by appealing to the eye will convey a basis of sound information through the medium of our much-vaunted "sight knowledge."

On the system of making instruction a matter of interest to the pupil, the earliest reading lessons should be, first, the old nursery rhymes; next, as a step more advanced, the standard fairy tales. These are subjects every child should be made acquainted with;* for, as shown by the investigations of Ralstone, Robert Hunt, and others, they had their origin in the myths of the early nations, and as such myths spread from common centres north, east, west, and south, according to the temperament of people they reached, so they became modified, whilst, as transmitted to us by such authors as the Brothers Grimm, they have become classic reading. Illustrated by such artistic sketches as the lamented George Cruikshank designed (to play the part of artificial memory as well as to excite interest), such reading lessons would be followed with avidity.

Passing from the infant school to those of a more advanced grade, it must be noted that at the middle-class schools, where pupils are only prepared for mercantile employment, Latin and Greek are not taught, and ancient mythology is a thing unknown. But surely every person who wishes to claim the position of being "educated" ought to have some clear ideas as to the characteristics of the mythological gods, goddesses, and heroes. This may be effected by a course of English reading on ancient mythology, illustrated by lantern slides of the most typical statues executed by ancient and modern sculptors, thus seizing the opportunity of imparting at the same time a very desirable amount of artistic knowledge. A biographical course of reading, illustrated by the lantern in a similar manner, would make the student familiar with the characteristics of the most important personages who have gained name and fame in connection with literature, science, art, religion, warfare, or commerce. Without such courses of abbreviated instruction much that a person would read in the daily papers or in modern literature, or see at public museums, art galleries, &c., would be utterly incomprehensible.

These ideas are not flights of fancy, but have been tried practically at Moscow, and the result is that the instructor finds he can teach "better and quicker" when lantern illustrations go hand in hand with reading lessons or lectures.

SAMUEL HIGHLEY, C.E., F.G.S., &c.

* Alas! how many children of the poor have ever heard of Cinderella, Hop-o'-my Thumb, or any other of the heroes or heroines of fairy-lore?

FOREIGN NOTES AND NEWS.

A METHOD OF DISTINGUISHING THE SILVER HALOIDS.—THE THEORY OF THE LATENT IMAGE.—THE BELGIAN MEDAL FOR THE BEST DRY PROCESS.

A SIMPLE method has been published, by Herr Goldschmidt, by which with the aid of the blowpipe the various haloid salts of silver may be distinguished. Take a piece of charcoal, and, having scooped out a small cavity, place in it a small quantity of the substance to be tested, together with a little sulphide of bismuth, and apply the flame of the blowpipe. If the matter under examination be silver iodide a brilliant red incrustation will be formed at a little distance from the cavity; if it be silver bromide the colour will be deep yellow, while the chloride gives a white product. The sulphide of bismuth may be prepared with the greatest ease by fusing the metal with flowers of sulphur.

Apropos of the discussion which has been proceeding in our columns upon the sub-bromide theory, the following remarks of Captain A. Hannot, in the *Bulletin Belge*, may be noticed. Speaking of the theory of the formation of the latent image, he says:—"Probably the action of light upon iodide of silver results in the formation of a sub-iodide, in conformity with the following chemical equation—

$$3\,Ag\,I = Ag_2\,I + 3\,I\ (sic),$$

and probably also this transformation takes place only in the presence of a body capable of absorbing iodine. In the wet collodion process the excess of nitrate of silver which covers the sensitive plate plays this important part, since if a plate be thoroughly washed upon its removal from the silver bath the alteration of the iodide by light does not take place. The reaction brought about by the presence of nitrate of silver should be as follows:—

$$6\,I + 6\,Ag\,NO_3 + 3\,H_2\,O = 5\,Ag\,I + Ag\,IO_3 + 6\,H\,NO_3."$$

With regard to the first equation, we may remark that the formula $Ag_2\,I$ for sub-iodide of silver represents the continental view of the composition of that substance; independently of that the equation contains a palpable misprint. The second formula introduces a new salt—iodate of silver. How would the formation of silver bromate affect an emulsion?

We learn from the *Bulletin Belge* that the gold medal of 500 francs offered by the Belgian Photographic Association for the best dry collodion process has been awarded to Mr. Warnerke. The *Bulletin* goes on to remark that Mr. Warnerke's process "is destined to work a veritable revolution in the practice of photography by its simplicity and the uniformity of its marvellous results, which will ensure for its clever inventor a distinguished rank amongst the illustrious *modificateurs* of the discovery of Daguerre and Niepce." We were not previously aware that emulsion photography was a modification of any process of either Daguerre or Niepce, and, moreover, it appears to us that our Belgian *confrères* are a little deficient in their knowledge of the history of emulsion processes, or that Mr. Warnerke has something good to publish.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 4........	West Riding of Yorkshire......	Oddfellows' Hall, Bradford.
,, 4........	Photographers' Benevolent	160A, Aldersgate-street, E.C.
,, 6........	Edinburgh	5, St. Andrew-square.
,, 6........	Bristol Amateur	Museum, Queen's-road.
,, 7........	South London	John-street, Adelphi.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE monthly meeting of this Society was held at the Memorial Hall, on Thursday evening, the 14th ult.,—Mr. Alfred Brothers, F.R.A.S., President, in the chair.

After the routine business had been transacted, Mr. W. Watts and Mr. William Banks were elected members.

Mr. W. J. Chadwick then read a paper, contributed by Mr. Woodbury, on *The Modern Magic Lantern* [see page 98], and exhibited the pyro-light alluded to in the paper. He (Mr. Chadwick) also exhibited one of Mr. Fletcher's air and gas apparatus. Mr. Chadwick further explained how the sciopticon was adapted for use with the lime light, showed his improvement on Mr. Woodbury's lime-holder, and concluded by presenting the Society with an oxyhydrogen burner for the sciopticon, for which the thanks of the Society were voted to him.

A member exhibited a portrait which was said to have been taken by the Vanderweyde artificial light. The portrait was a very good one.

Mr. Noton showed his swing-lens mount in its completed state.

Mr. Coventry exhibited an ingenious pocket camera and stand designed and made by himself.

Mr. J. W. LEIGH showed a transparency on a collodio-albumen plate, developed with ferrous oxalate dissolved in a solution of potassium oxalate. The colour of the deposit was not considered suitable for transparencies, although an excellent one for negatives. He (Mr. Leigh) said the developer, when first applied, became black, owing to the plate having been treated with gallic acid.

Mr. D. Young came prepared to exhibit another improved gas retort, also a perfected Keevil's lantern; but time would not admit of these being shown.

The members, and several gentlemen of the Liverpool Amateur Photographic Association who were present on a return visit, then adjourned to another room, and did ample justice to an excellent knife-and-fork tea.

The PRESIDENT congratulated the company on being favoured with the presence of their Liverpool friends, which was suitably responded to by Mr. W. H. Wilson, of Liverpool, on behalf of himself and his companions.

After the wet and dry processes had been satisfactorily worked up in the refectory, the company adjourned to the large hall to witness a lantern exhibition, conducted by Messrs. W. J. Chadwick and N. Wright. The apparatus used were two sciopticons with the lime-light arrangement, the oxygen being produced during the time of exhibition by Mr. Chadwick's generator and gas-holder. The pictures shown (including a fair proportion by members of the Society) were very choice, and the gas apparatus did its work excellently.

The walls of the meeting-room were adorned with a number of capital pictures by Messrs. Coote, Leigh, Sanderson, and other members; and, after a most enjoyable evening, the meeting was adjourned.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

A MEETING of this Association was held in the Religious Institution Rooms, on Thursday, the 14th ult.,—Mr. John Urie occupying the chair.

The minutes having been read and approved of, Mr. Sloan gave an extempore sketch of a photographer's experience on the Ohio. It was very amusing and greatly appreciated by the members, and Mr. Sloan was awarded a hearty vote of thanks.

The Secretary made a statement concerning the artificial light collodion transfer process of Mr. J. Solomon, of London, and distributed some of Mr. Solomon's transfer paper. The following is the method and formula:—First soak the transfer paper for a quarter of an hour before using it. Dissolve half-an-ounce of bees'-wax and an ounce of rosin in a pint of turpentine. Clean a glass in the usual way, then with a small quantity of the above rub over the surface of the glass with a linen pad, so that the substratum shall be kept thin. Coat the glass with a collodion slightly ripe. The nitrate of silver bath is the ordinary negative one. As a focussing medium on the screen cover a piece of glass with white paper, and when focussed sharply it is replaced by the sensitised plate. Exposure—supposing the negative to be a vignette *carte de visite* enlarged up to 12 × 10—from ten to thirty seconds by the magnesium light, according also to the density of the negative. Developer:—Three grains of pyro., three grains of citric acid, and five minims of acetic acid in one ounce of water. Alcohol, if necessary, according to the oondition of the nitrate bath. Fix in hypo. and wash. Then take the wet transfer paper, place it on the image, squeegee out all the bubbles, plaee it upright to dry, when the paper will come away from the glass with the image. Mount on cardboard with glue. The transfer paper is a commercial article, and sold at a very moderate price. Mr. Solomon also sent samples of his absolute non-actinic cloth.

Mr. Solomon was heartily thanked for sending his formula, and it is expected that the members will have something to say on transfers at the next meeting.

A vote of thanks to the Chairman concluded the business, and the meeting was adjourned.

Correspondence.

PACKING NEGATIVES.

To the Editors.

Gentlemen,—It may be of interest to some of your readers to know of a safe method of packing a large quantity of negatives which have to travel a long distance and endure rough usage.

I have just transferred my printing establishment to London, and I am indebted to an amateur friend for the following plan of packing between two and three thousand valuable negatives:—

They were first placed in the ordinary grooved boxes, a layer of thick felt being placed on the bottom for the plates to rest upon. The spaces between the plates were then filled with dry sawdust; sheets of wadding were then placed on the top of the negatives and the lids fastened down, thus rendering each box a solid mass. These boxes were then packed in strong heavy cases—the whole, with printing-frames, weighing over two tons—and I am pleased to say they were delivered at Dulwich without a single breakage, or even a scratch.—I am, yours, &c.,

6, *Rosendale Villas, West Dulwich, February* 26, 1878. Payne Jennings.

THE FORTHCOMING PARIS EXHIBITION.

To the Editors.

Gentlemen,—British photographic exhibitors at the approaching Paris exhibition are in a difficulty from the necessity of appointing and naming an agent in Paris who will receive the pictures and hand them in to the exhibition authorities.

From communications I have had with a number who are similarly situated to myself I find we know no one in Paris to whom we can entrust this, notwithstanding the enormous number of applications. Can you or any of your readers assist us? If a united scheme could be devised to send the cases for collection to some centre, and some agent takes charge of the whole lot, much expense and difficulty would be saved.—I am, yours, &c., Samuel Fry.

Surbiton, February 27, 1878.

[The publication of this note will, doubtless, evolve a solution of the difficulty.—Eds.]

VOIGTLANDER'S NEW LENS.

To the Editors.

Gentlemen,—My attention has been drawn to your issue of the 1st ult., wherein you quote some paragraphs from Herr Voigtlander's specification, and, in a few sentences, proceed to draw therefrom inferences which are erroneous and the result of a misconception.

Any person reading the concluding paragraph in your notice of the new lens would at once infer that the visual and chemical foci were *for all practical purposes* not coincident, as in the old form of lenses made a generation ago; the visual focus having been obtained the chemical focus had to be arranged according to a scale. I need hardly say that no person in his senses would, at the present day, purchase such an instrument.

It is, no doubt, difficult to give a very clear description in a foreign language of any subject in which technical expressions are of the greatest consequence, and it is still more difficult to convey the same meaning as in the original language. I will content myself with making a statement only, viz., that, in point of fact, having with the new lens obtained the visual focus you have in the same plane the chemical focus of the highest intensity. For all practical purposes, therefore, the two foci are coincident, and this holds good for all distances.

With regard to the other suggestion respecting the quality of the glass used, permit me to state there is every reason for believing that a period which might be measured by a man's lifetime would be necessary for bringing about a change in the colour of the dense flint glass of the quality used by Herr Voigtlander, and at the expiration of such a period of time the character of the lens as a photographic instrument would in no way be altered. I need hardly say that Herr Voigtlander is thoroughly acquainted with everything that has been suggested or written about the manufacture of glass for optical purposes.

A much denser flint glass than that used for the new lens was employed in the manufacture of old telescopes by Fraunhofer and Dolland at a period when the manufacture of optical glass was imperfectly understood. I think that no person would have hesitated to purchase telescopes of those makers even with the certainty that, say within fifty years, they would have become useless, but a much longer life may be predicted for the new symmetrical lens by Herr Voigtlander.—I am, yours, &c., R. W. Thomas.

London, February 26, 1878. *Agent for Voigtlander.*

[If Mr. Thomas compare the account of the lens given in the Journal with that in Herr Voigtlander's final specification he will find it to be what it purports to be, viz., a *literal* and complete transcript, and not merely the quotation of "some paragraphs." It is matter for regret that the patentee had not employed a patent agent conversant with English idioms; because in all English works devoted to photography the over-correction of the *visual* image in order to obtain the *chemical* image as perfect as possible has, by universal consent, been held to signify that these two images are not coincident. We are pleased to be informed that Herr Voigtlander's own very decided words do not here correctly interpret his meaning; for, like our correspondent, Mr. Thomas, we are of opinion that the most useful lenses are those in which both the visual and chemical foci are brought to the same plane.—Eds.]

TERRIBLE EXPLOSION OF A CYLINDER OF OXYGEN GAS.

To the Editors.

Gentlemen,—Your issue of January 25th contains an account of the explosion of an oxygen retort which possesses more than ordinary interest for many of your readers on this side of the ocean, from the fact that a similar accident has recently occurred in our neighbouring city, Baltimore, with fatal results. If a brief statement of the facts will give emphasis to the necessity for care in the use of oxygen gas, your space and my time will not be employed in vain.

On the afternoon of January 23rd, a few minutes previous to the commencement of a *matinée* performance in one of the theatres of Baltimore, the gas was turned on from a copper tank of compressed hydrogen gas, which exploded with terrific violence on a lighted match being applied to the jet. The operator received injuries from which he died in the course of a few hours, and one or two others were seriously hurt.

The apparatus for the production of the light consisted of two copper tanks or cylinders, each about ten inches in diameter by forty inches in height—one containing the ordinary house gas, used in place of pure hydrogen, and the other oxygen, each being under a pressure of about eighty pounds per square inch. The blowpipe, tubing, &c., were of the usual form.

This apparatus had been used the evening before with perfect safety, and the testimony at the inquest showed that the only thing that had been done in the interval was to add ten pounds pressure per inch to the oxygen cylinder. The result shows that a mistake must have been made, and that the ten pounds of oxygen was added to the wrong cylinder, forming an explosive mixture.

The cylinder was blown into fragments, which flew in every direction; the bottom, passing through the floor on which it stood, broke a floor beam in two and went through a second floor below. The explosion was undoubtedly less violent than it might otherwise have been from the weakness of the cylinder, which was made of sheet copper not more than the one-twenty-fourth of an inch in thickness.

The mistake of compressing oxygen gas into the wrong cylinder was due to carelessness and the absence of any adequate means of distinguishing between the cylinders.

The use of these gases compressed in this manner has become so common with us as to afford a profitable business for one company in New York. Their method of making the gas and precautions against accident may, perhaps, interest your readers at another time.

With one exception they have had the good fortune to escape serious accident for many years. In August, 1877, a cylinder exploded at their works, from a cause so singular and unlooked for that I trust you will spare me a few lines more of your valuable space in which to state the facts.

A workman had been engaged, during the dull season, in soldering on to each cylinder a brass plate giving the name and address of the company. One of these cylinders contained oxygen gas, compressed to 225 pounds per square inch. It was made of iron about three-sixteenths of an inch thick, was eight inches in diameter by thirty-six inches in height, and had been tested to 500 pounds per square inch. The workman had filed a bright surface for the plate, which was 3 × 4 inches, and applied a heavy soldering iron, the heat from which caused such an expansion of the compressed gas as to explode the cylinder, killing the unfortunate man almost instantly.

These two accidents show that the danger of explosion is not confined to impure chemicals in the retort, but may be caused by a mixture of the two gases, however strong the cylinder containing them, or by the application of a considerable amount of heat to a full cylinder.—I am, yours, &c., J. J. Wilson.

New York, February 16, 1878.

MR. M. CAREY LEA'S FERROUS OXALATE DEVELOPER.

To the Editors.

Gentlemen,—I have been using Mr. M. Carey Lea's ferrous oxalate developer, and can confirm all that Dr. Huggins says about it. It is a most admirable developer, and I strongly recommend all dry-plate workers to give it a trial.

The most convenient way to use it is in a dipping bath, the plate being washed with water before immersion. It must also be well washed with water after development and before fixing.—I am, yours, &c., Joseph W. Swan.

Newcastle-on-Tyne, February 27, 1878.

"TRIAL OF LANTERNS."

To the Editors.

Gentlemen,—The report of the "trial of lanterns" at the last meeting of the Bristol and West of England Amateur Photographic Association renders the following account necessary. It will be remembered that the above mentioned was not considered conclusive or satisfactory. I afterwards received a letter from Messrs. Newton and Co. expressing much surprise and dissatisfaction at the result, which you will see was warranted.

It appears that Messrs. Newton and Co. had extended permission to other opticians to make their patent refulgent lamp, and unfortunately some of them were made in an incorrect manner; one of these I was using in the lantern referred to in the last report. Messrs. Newton and Co. at once sent me one of their own phantasmagoria lanterns and refulgent lamp complete. It was then at once evident where the defect lay; the lamp used on the former occasion had inadvertently been constructed with half an inch *less* burning surface on each wick.

Last week, therefore, a most careful and crucial test was applied, with the following result:—1. As to triple-wick lamps. The only two I believe in the market were tried. Result: Newton's triple-wick refulgent lamp was superior to Hughes's triplexicon as to volume, quality, and diffusion of the light.—2. As to double-wick lamps. Newton's plantasmagoria lantern and refulgent lamp was decidedly superior to the sciopticon, there being better illumination and more even diffusion of light.

It will, therefore, be seen that the triple-wick lamps *both* gave a little more light than the double-wick, but it was considered that none of the three-wick lamps at present in the market gave enough extra light to make it worth while to use them in preference to the double-wick lamps, when the extra heat given out and the extra trouble of management is taken into consideration.

The opinions here stated I give as they may interest your readers, and were the *unanimous* ones of all the exhibitors and others present, viz., the President, Vice-President, Treasurer, and Secretary of the Bristol and West of England Amateur Photographic Association. There were many other merits and demerits discussed, but these I will not enter upon, the light being that really under consideration.

I probably should not thus have troubled you had not the former communication on the subject been sent.—I am, yours &c.,

February 27, 1878. H. A. H. Daniel,

Hon. Sec. B. and W. of E. A. P. A.

"A GROWING GRIEVANCE."

To the Editors.

Gentlemen,—Respecting the above, which appeared in the Journal a fortnight since, I have been much impressed with the importance of bringing such a subject under the discussion of the photographic public. I should have written this last week, but I fully expected to see the matter thoroughly taken up in your last issue.

Although I cannot say I have suffered as a principal in this increasing evil of repeated and unnecessary re-sits, as an operator I have had my patience often tried, and none would be happier than myself to see its removal.

I quite agree with what you say respecting the present plain-fitting garments and soaped-down locks of the fair sex, and think it is the cause of *many* re-sits; but there are other sources from which the evil springs.

The first—and worst, I believe, if not the original cause—is the practice of photographers advertising "No orders completed unless the proofs are approved." I believe this plan is dying out—not before time; it has taught the public a practice that will take years of the strictest application of a system in the opposite extreme to erase. The firm I am connected with—one of the oldest in the north—carried on this approval system to perfection until they became aware that an astonishing number of negatives taken during the year were either retaken or never ordered from; the proofs, of course, as the sitters were not pressed for payment at the time of sitting, were never returned, therefore involving a dead loss in each case.

A few instances will give you an idea of the effects of this system. A lady was photographed seven different times during an interval of about nine months; she changed her dress every time, and even at the end of the performance was not satisfied, but ordered six cabinets, and was quite surprised when she found she was charged for all the previous proofs. She said:—"I thought I could be taken until I approved of the proofs, free." Another had three re-sits for half-a-dozen *cartes de visite;* and another buxom dame, wanting one cabinet, expected two to choose from, and because there was not *would not like it,* but sat again, and after all took the first. I could give numerous other instances, but these will be sufficient to show that the approval system ought to be stamped out.

And now I have a word to say about the system at present so much adopted—that of prepayment for orders at the time of sitting. It is certainly much better than the above, but my experience of it convinces me that it encourages re-sits, for the simple reason that when people pay in advance they expect you to please them, and if you are strict enough to limit all re-sits to those whose proofs are photographically at fault then people look upon you as rather given to sharp practices. The following is the usual way of transacting business under this head:—A party comes to have a photograph taken, and upon returning to the show-room to leave the name and address, he or she is asked the extent of the order, and politely informed that it is the custom to pay at the time of sitting. Of course such a thing was never heard of, and the question is asked—"What will be done if the proofs are not liked?" Now, there you are. In nine cases out of ten the visitor is told he or she can have another sitting, and pay on these conditions. Now where will you find the lady who can resist the temptation just to try once more when she has paid on such conditions as these? You grant a privilege, and of course it will be used. You can answer this question another way if you like. You may say "provided there is any fault on our part;" but refuse to re-take them on these conditions and you find you are looked to for a good expression, or even to make a bad-fitting dress fit well, or an ugly face charming, or your clients are mortally offended if you don't give them one more trial.

Another mistake from which re-sits spring is the custom among photographers of never turning a sitter away however bad the light; they get what they can and consider they have done their duty. But I think it would be wiser to mark all those down as failures, and send an intimation to the sitter to come again in better weather than to retouch and print from a bad negative, and draw down upon the photographer the criticism of the customer's friends, while it impresses upon their minds that if they don't like their proofs they can sit again.

You will now think it time I was suggesting a remedy for the evil I have written so much about. Well, first of all, let photographers drop that pernicious custom of sending a circular out with their proofs in which is expressed an invitation amounting to this:—"If the proofs are not approved of we will be happy to give you another sitting." I would suggest that in every show-room should be placed a list of prices drawn out as follows. Supposing the charge is twelve shillings per dozen for *cartes de visite,* and twenty-four shillings for cabinets:—

"*Cartes de Visite.*

Per sitting of two positions.	Per dozen.	Re-sits, one position.
3s.	10s.	2s.

Cabinets.

5s.	20s.	3s.

All sittings to be paid for at the time, and all orders to be paid for when given."

I think if the above be placed where everyone who enters could read it you need not care how many times the person came to be retaken, as you always pay yourself for pleasing them. In this way you give your sitters fourteen *cartes de visite* and receive 13s.; or fourteen cabinets, and receive 25s. I think this is reasonable on both sides, and I believe it would stamp out re-sits in most instances; for I have found that when you enforce extra payment some beauty is generally discovered in the proof which hitherto had "blushed unseen."—I am, yours, &c., Reflex.

February 25, 1878.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Postage-stamp camera and six lenses, diamond cameo ditto, stereo. ditto, and other articles will be given in exchange for posing chair, backgrounds, and enlarging camera.—Address, H. DUNBAR, 74, Paradise-street, Liverpool.

Wanted in exchange, a Dallmeyer's 1B ordinary lens, a curtain background and studio camera, for a 10 × 8 burnisher, solar camera (complete), printing press, type, &c.—Address, PHOTOGRAPHER, Broadway, Victoria Park, London.

Wanted, anything useful in photography, in exchange for the following:—Stereo. camera, focussing glass and dark slide (for one lens only); 20 × 15 tilting bath; porcelain washing trough and colander (Harvey's); a Leach's enlarging apparatus for reducing or enlarging from fifteen inches; also, two tripod stands for field work (very strong), and several plate-boxes.—Address, WM. JOHNSON, 2, Tower-street, Stockton-on-Tees.

ANSWERS TO CORRESPONDENTS.

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

NOTICE.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

B. JONES.—See a letter by Mr. R. W. Thomas in the present number.

J. J. WILSON (New York).—Thanks. Such an article as you suggest will be very useful and interesting.

J. R. JOHNSON.—Our correspondent will have something to say on carbon printing improvements in our next number.

H. HAMILTON tenders his thanks to Mr. John Cowell for his able letter in answer to the query put to the latter gentleman. His advice shall be acted upon.

HENRY SWAN.—The intensity of the illumination does not depend upon the diameter of the condenser, but upon the relation existing between the distance of the light from, and the diameter of, the condenser.

GEORGE BROWN.—Try the effect of adding an ounce of nitric acid to the washings containing the chloride, and then stirring well with a glass slab. This will cause the precipitation to take place more rapidly.

Z. X. (Perth).—To reduce the over-printed proofs place them in a weak solution of cyanide of potassium—say of the strength of half-a-grain to the ounce of water. A little solution of chloride of gold may be added with excellent toning effect.

MARY B.—No method exists by which a negative from a print on albumenised paper can be obtained that will yield proofs quite equal to the original. The best way of proceeding will be to produce an enlargement, work it up carefully, and then from it obtain the negative.

A PLYMOUTH "BROTHER."—1. No. 3 is by far the most artistic picture of the collection; the others are very indifferent indeed.—2. No copyright exists.—3. Calomel is a sub-chloride of mercury, and for photographic purposes will not answer as a substitute for the bichloride.

GEORGE WOOD.—You have misunderstood us. We distinctly said that *previous* to sunning the silver bath it should be rendered alkaline, whereas you appear to have placed it in the sun in an acid condition and then rendered it alkaline before using it. No wonder you could not obtain presentable negatives. Read our directions again, and follow them to the very letter.

J. H. J.—Tannin forms a most invaluable preservative, and plates prepared by its aid will keep well for several years. But this applies only to the unexposed plates; for, after exposure, if the development be delayed for any lengthened period, the latent image will be found to have been slowly but surely flying away all the time, until at length by no process of development whatever could an image be made to appear.

PHOTOLITHO.—Engravings may be copied *quite well* by means of collodion emulsion. You labour under a great mistake in supposing that blacks free from fog cannot be obtained. By making use of a bromide of silver film you may obtain a greater control over the quality of the resultant negative than by any other process, because by increasing the proportion of soluble bromide in the developer you may go on increasing the density up to absolute opacity without veiling, in the slightest degree, the finest lines of the engraving.

J. SCHOFIELD.—Our correspondent observes that he is unable to understand Captain Abney's formulæ. He says:—"I have made ten ounces of bromide of zinc emulsion, as given in Captain Abney's work, page 83, but cannot understand why so large a proportion of solvent should be used, viz., six to eight grains to two ounces of ether and alcohol. Is it the ordinary proof spirit that is meant? I have used methylated ether ·720 and methylated alcohol ·805, and have got a very thin emulsion, which, I know, will not matter, as it has to be washed. Can I save the ether and alcohol by adding more cotton and silver without affecting the emulsion at present made?"—We see no reason why the proportion of solvents should not be reduced.

BELPER.—Kindly put your queries in a more definite form and number them, retaining a copy for yourself. We shall then be enabled to give the required information.

REV. W. G.—It not unfrequently happens that the pyroxyline with which collodion is prepared has been made under such conditions, as regards the strength of the acids, as to render it soluble in alcohol. This explanation will suffice for explaining the cause of your negative film becoming dissolved when attempting to varnish it. The remedy in this case will consist in the reduction of the strength of the alcohol by adding a few drops of water to the varnish.

W. J. SHIRTCLIFFE.—The maker of the lens has an excellent reputation. When it is to be employed in portraiture the small lens must be laid aside. Unless we examined the combination we could not indicate the manner in which the small lens is to be utilised. If your drawing be strictly accurate, the position of the back lenses has been reversed; the *convex* lens must be placed nearest the end of the tube. In the drawing the concave lens occupies that position.

ROBERTA.—The lens you describe is a "triple achromatic." It is a form that is not now manufactured, although it was much in use at one time. You must not remove the small concave lens when using it; for, although by such an act the focus would be shortened and the rapidity of its working greatly increased, the area of definition would be *very* much reduced and the image altogether greatly inferior to that which would be obtained by retaining all the lenses in their proper places.

R. H. H.—The mere specifying of an invention without going into details will be held as a suggestion only, which is not susceptible of receiving protection by patent. Here is one test by which the soundness of a patent may be ascertained: the specification must contain such a clear statement of the details of the invention as to enable one of that class of the public conversant with the subject in its general aspect to carry out the invention to a practical issue. The following is what Mr. Hindmarch, one of the commissioners appointed to inquire into the working of the law of patents, says in his report:—"Specifications of inventions are frequently prepared in such a manner as to occasion great difficulty in construing them, and in ascertaining the nature and extent of the claims of inventions they are intended to make, and from this cause the cost of litigating patent rights is often greatly enhanced. There is too much reason for believing that specifications are frequently thus prepared with a fraudulent object. A specification ought to define the invention intended to be comprised in a patent so as to enable any person of ordinary skill and intelligence upon reading it to ascertain without difficulty the nature and extent of the right conferred by the patent. If an alleged invention cannot be so described it is one which, if it deserves to be called an invention, ought not to be made the subject of a patent." From the preceding will be obtained *data* upon which to determine the soundness of a patent so far as the specification is concerned.

RECEIVED.—*The Artists' Annuity Fund Almanac.*

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The next meeting of this Society will take place in the Rooms of the Society of Arts, Adelphi, on Thursday next, March 7th, when Mr. Wratten will illustrate the development of an emulsion plate.

THE ESTIMATE OF ENAMEL PHOTOGRAPHY BY ROYALTY.—On Friday last Mr. A. L. Henderson was summoned to Windsor, where he had the honour of submitting to Her Majesty the Queen a number of enamels intended for the Paris exhibition. Of these Her Majesty expressed her approbation, and retained for her own collection several of the specimens.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.
For the Week ending February 27, 1878.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Feb.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
21	30·62	W	42	44	55	37	Foggy
22	30·63	W	48	50	52	43	Foggy
23	30·46	W	46	48	52	46	Dull
25	30·13	W	44	46	55	44	Cloudy
26	30·12	W	46	48	53	43	Cloudy
27	29·99	SW	44	47	—	44	Dull

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 931. Vol. XXV.—MARCH 8, 1878.

DIRTY PLATES.

Of all the troubles which beset photographic operations there is, perhaps, nothing more annoying than a dirty plate; for though, in a general way, it is a matter of no difficulty to secure immunity from the evil, it will crop up unexpectedly at inopportune times without any apparent cause and without any departure from the ordinary routine of plate cleaning. The occurrence of these accidental dirty plates is, of course, dependent in a very great degree upon one important point—whether the glass is new or has been previously used; but, although this difference between new and old plates does exist in practice, there is really no just reason why it should be so, for the extra liability of the used plates to produce stains under a second development arises solely from carelessness or want of method in the treatment of glasses which are set aside to be cleaned and re-used.

The constant recurrence of failures attributable to this cause has had, no doubt, much to do with the general spread of the practice of using a preliminary coating both in wet and dry-plate work. In the latter branch the substratum was found necessary on account of the great tendency of the film to leave the glass during development, especially with certain preservatives; but in the wet process, where no such tendency exists, the very general practice of albumenising the plate can only be looked upon as a safeguard against dirty plates. Even in dry processes, though it has been found that, for small and medium-sized plates, a mere edging of india-rubber or albumen is sufficient to retain the collodion film in its place throughout the operations of developing, fixing, and washing, many operators still prefer the more troublesome course of covering the whole surface. This, then, forms another argument in favour of viewing the substratum in the light of a preventive against stains on development.

In dry-plate work, however, during the last few years there has been much less trouble arising from dirty plates—a fact which may be accounted for in two ways:—Firstly, by the introduction and general adoption of emulsions in place of the bath; and, secondly, by the substitution of alkaline pyro. for the older silver development. It was long since noticed that in using an emulsion process much less care in cleaning the plates was necessary than when the bath was used, and this was explained by the supposition that the free silver contained in a bath film produced the stains by its action upon the organic or other matter adhering to the surface of the glass, but that in the case of an emulsion film, there being no free silver present (we speak of the old collodio-bromide process), the stains were not produced. How far this may have been true or how much dependent upon the fact that alkaline pyro. development was employed we do not now pretend to say, but we are strongly of opinion that the latter was more probably the correct explanation.

That the employment of alkaline development secures a remarkable immunity from stains arising from imperfectly-cleaned plates there cannot be a doubt. First noticed accidentally, we have frequently proved the fact by actual experiment, and within the last few days we have had it brought to our notice in a particularly striking manner. In experimenting upon the comparative density of the image rendered by various modifications of the alkaline developer a developed picture was "bleached" by means of bromide of copper, and, after re-exposure, again developed with alkali. This treatment was repeated four times without any abnormal reduction, a perfectly clean development resulting from the last application of the alkaline pyro. The effect of silver intensification was then tried, but before any accession of density was noticeable the plate was completely covered with markings running in a circular direction, and evidently caused by a particle of some impurity having been rubbed over the surface of the glass in polishing. To place the cause beyond doubt we repeated the experiment upon a plate purposely smeared with a damp duster, and afterwards only lightly polished, and the result proved to be in every way identical with that just described.

We do not wish it to be inferred that we put forward this feature of alkaline development as an encouragement to carelessness and want of cleanliness—quite the contrary; our reason for mentioning it is simply this:—We have on more than one occasion expressed an opinion in favour of silver intensification in preference to completing the image with alkaline pyro. alone, and we have heard several objections to the silver method on the ground of its liability to stains and markings. Now, as this defect was not laid to the charge of silver development when it was the only means available it appears to us that those who bring it forward at the present time have by long use of the alkaline method unconsciously fallen into habits of carelessness in the matter of plate-cleaning; they have found that a comparatively small amount of trouble suffices to clean a plate so as to pass the ordeal of alkaline pyro., but when tested against pyro. and silver it is found to be wanting. In justice, then, we ask those who object to the use of silver on the grounds stated to give it a fair chance, when, we have not the slightest doubt, they will find their objections groundless.

Upon other grounds also we put in a plea for greater care in cleaning the plate. It seems probable that the new developer—ferrous-oxalate—will play an important part in dry-plate photography in the future, and it may be as well to state that it is not endowed with the same latitude in this respect as alkaline pyro.; moreover, from what we can, so far, see of its action silver intensification will, in the majority of cases, be indispensable, hence any shirking the work of plate-cleaning will, in all probability, lead to the unjust condemnation of the new method.

Let us now turn to another phase of the "dirty plate" question in which there is room for some reform. It is the practice in many cases we know to allow dirty plates to accumulate until the stock of clean ones runs short. The excuse is invariably that it is not worth while cleaning two or three at once, so they are put on one side until a quantity probably representing a day's work has to be done. Independently of the magnitude and unpleasantness of the job (for plate-cleaning is not the most amusing of occupations), a large amount of unnecessary trouble is thus incurred.

If immediately a plate is spoilt in development it were washed free of the developing solution and put away until such time as it might be found convenient to clean it, matters would not be so bad; but in many work-rooms a receptacle containing a detergent solution is kept, to which all spoilt plates are consigned to wait the completion of the cleaning process. There exists a mistaken notion that by the adoption of this course the after-treatment of the glass is facilitated, but the contrary is the case. Excellent though the detergent may be when properly used, its over-use is as injurious as it is otherwise beneficial; whether it consist of soda, potash, or the mixture of bichromate of potash and sulphuric acid recommended by Mr. M. Carey Lea, it gradually acts upon the glass in such a manner as to necessitate a special course of treatment to neutralise its effect, if indeed that is always possible. Powerful alkalies are known to act upon the surface of glass by corrosion after long contact; indeed, the mere presence of pure water between two surfaces is sufficient to produce an indelible mark upon photographic glass. The action of the chromic acid solution is peculiarly powerful, as it appears to be absorbed into the pores of the glass, producing a strongly-marked metallic mottling which only appears when a subsequent picture is developed.

By far the better and, we think, the proper plan is to clean spoilt plates at once. As soon as a plate is found to be useless wash off the developer, and *before it has time to dry* remove the film. The moist film may be removed with the greatest ease by merely passing the finger over it, or if of a very adherent nature it will yield to gentle friction with the flat end of a good-sized cork; if allowed to dry the collodion contracts into a hard, horny state, and becomes much more difficult of removal, breaking up into minute fragments which adhere most tenaciously to the glass. By following this system, too, the films are easily collected and stored in a receptacle kept for the purpose, and will be found in the course of time to form a respectable item in the silver residues. After removing the film the plate only requires rinsing well under the tap, or for extra security may be rubbed on both sides with a pledget of cotton wool dipped in dilute nitric acid, rinsed, *and dried* with a clean cloth. If so much of the cleaning be performed without delay the expenditure of labour is a mere trifle, and the plates may then be stored away with perfect safety to await the final polish when required for use. The general adoption of a systematic plan of this sort will render the occurrence of a dirty plate a matter of rare occurrence, and entirely do away with that periodical *bête noir*, a day's plate-cleaning.

There is one more alteration we should like to see made in the system of plate-cleaning, namely, the abolition of detergent *powders*, at least in dry-plate work. They are, no doubt, extremely convenient as well as effective, but, however carefully applied, they are liable to cause much trouble in the shape of pinholes and spots. The electrical condition of the glass when submitted to friction favours the adherence of the particles to its surface, and the rough edges of the plates are almost certain to retain some of the powder, no matter how carefully it may be removed. The polishing cloth in this manner becomes impregnated, and the atmosphere loaded with the germs of innumerable spots, which the most careful operator is entirely at a loss to account for.

In conclusion: we may employ one more argument in favour of a thoroughly clean surface. It is in itself but little inferior to a substratum in merely retaining the collodion film upon the glass. If greater care were observed in securing a chemically-clean and well-polished surface we should hear fewer complaints of films slipping during development or splitting when dried; in very many of the cases of this sort we have no doubt the inducing cause is a dirty plate.

THE FUTURE OF CARBON PRINTING.

It is now no secret that the carbon patent of Mr. J. W. Swan expired on the 28th ult., and with it the monopoly in the making of carbon tissue with which the possession of that patent was so intimately associated. Up to this time the production of carbon tissue has been the sole right of the Autotype Company, but with the lapse of the patent such exclusive right passes out of their hands; and not only so, but the double transfer process of Swan is also thrown free to all. Let us see in what position this places photographers, by which designation we here mean professional artists.

First of all: the photographer can in future make his own carbon tissue with no more hindrance than applies to his manufacturing his own albumenised paper; or, if that be inconvenient, he can purchase it ready prepared in any or every market that is open. Secondly: he is now entirely at liberty to make use of the process of double transfer printing patented by Mr. Swan. This process consists in cementing, by means of a solution of india-rubber in benzole, the face of the exposed carbon tissue to the temporary support upon which it is to be developed, which support, after the picture has been developed and attached to its final resting place, may be removed by treatment with benzole or other solvent of india-rubber.

Now, so far as we are able to ascertain from the practice of carbon printers, the method of Swan to which we have alluded is not, and has not for several years, been practised by any photographer, having been entirely superseded by Johnson's method of developing, viz., attaching the tissue to its temporary support by the mere contact imparted by the pressure of the "squeegee." So far, therefore, as concerns the process of double transfer now thrown open by the expiration of the patent, the public gain nothing, seeing that that process has long since fallen into a state of desuetude.

The relations existing between the Autotype Company, who are the holders of Johnson's patent, and those who make use of the double transfer process now in universal use, is one possessing interest for all. It is competent for that Company to couple the granting of licenses for using the process with any conditions they may choose to impose, and it is quite legal for them to insist upon the purchase of all the tissue as manufactured by themselves as one of the conditions. We are glad to be able to say that they have adopted a more generous policy, and will allow their licensees to provide themselves with tissue in any suitable market. Now, when we consider that the Company possess the legal power to insist upon those who employ the ordinary method of double transfer printing to use only such material as they themselves manufacture and supply, it will be acknowledged that they are treating the public in a liberal spirit by making the concession of free trade in the manufacture of tissue.

We observe that the Autotype Company have strengthened Mr. Johnson's patent for double transfer by removing certain branches which added no strength to the main trunk. We have hitherto refrained from expressing any opinion concerning the validity of this patent; but we may now, and once for all, say that in our judgment the patent for Johnson's method of double transfer rests upon an incontrovertible basis. Its existence may be distasteful to a few—although *why* it should be so we are at a loss to understand. Still, there the fact remains—the patent, always good, has now been rendered impregnable by the judicious disclaimer of certain parts that have been lodged without opposition.

In conclusion: what we have said applies to double transfer only; single transfer has long been free to all.

STANDARD SOLUTIONS.

The want of a recognised standard of reference whereby to refer many solutions and liquid chemicals employed in photographic manipulations is often a source of considerable trouble and, when describing any process where definite exactitude is necessary, the cause of much loss of time, by the periphrasis rendered necessary. Thus we often have processes for making gun-cotton given where the sulphuric acid has no strength or specific gravity appended to it, although a variation of one half per cent. in strength would make the difference between a free-flowing and a ropy collodion. Or, again: take ammonia solution as recommended for alkaline development; this is made of all strengths, and is liable to great fluctuation, according to the source of supply and the manner in which it is kept. It is evident that when a difference of twenty or thirty per cent. can be frequently found in samples of the same assumed strength, a corresponding difference and uncertainty must prevail during the important operations of bringing the latent image to view.

We have, therefore, deemed it desirable to call attention to the fact that there does exist a recognised authority for definite strengths of various solutions and liquids, and that such solutions are now to be purchased, and also test liquids, by which to verify their strengths, at almost any chemist's in town or country. The authority we allude to is the British pharmacopœia, which, published in the form of a book, fixes by Act of Parliament the various chemicals, &c., used in compounding medicines and the requisite tests; and, as these include almost the whole of those made use of in photography, it is evident that a more suitable standard could not be found, for we do not think we are wrong in stating that ninety-nine out of every hundred photographers go to the nearest chemist and druggist's establishment when they wish to replenish their stock of chemicals.

Again: it is a convenient plan to have solutions of frequently-employed chemicals on the dark-room or laboratory shelves to economise time in the preparation of such liquids as developers, &c. Some of these, too, have their strengths laid down in the pharmacopœia, and hence may be purchased ready for use at the chemist's. The purity of the chemicals we employ being a matter of vital importance, some ready mode of determining their strength is a matter of considerable convenience; this also is rendered an easy matter by the same means. We now proceed to give some notices of those chemicals whose strength is liable to variation or sophistication.

Nitric Acid.—This is to be had of all strengths in commerce, but the pharmacopœia recognises only one strong acid—that of specific gravity 1·42. This acid is of a definite degree of hydration, is not liable to change when kept out of the light, and is altogether the one most generally to be depended upon. Mr. Hardwich, in his classical researches on gun-cottons, recommended an acid of specific gravity 1·5; but it is not a desirable acid to employ, owing to the quickness with which it loses strength, the first-named being available for all purposes of pyroxyline making. One thousand grain measures of a test solution of soda, which is described in the pharmacopœia (under the name of "Volumetric Solution of Soda"), should exactly neutralise ninety grains of nitric acid. This test solution, which we shall refer to again, is of great importance in estimating the strength of acids. It is referred to oxalic acid as an original basis of calculation, and requires considerable care in making; as it can be purchased ready made we shall not further describe it beyond saying that one thousand grain measures is capable of exactly neutralising "one equivalent in grains of any monobasic acid." With regard to nitric acid: it would be found very convenient to keep a dilute solution of it in distilled water in the proportion of ten per cent. for the purpose of adding to baths or, indeed, in any case (where water is admissible) in which drops are given in a "published formula."

We next have to refer to *Hydrochloric Acid.*—The pharmacopœia strength of the acid is specific gravity 1·16, and of the volumetric solution of soda one thousand grain measures neutralise 114·8 grains of acid. This acid contains 31·8 per cent. by weight of the hydrochloric acid gas dissolved in water.

Other acids employed in photography are tartaric and citric, and, when pure, seventy-five and seventy grains of each respectively are capable of neutralising one thousand grain measures of the volumetric solution of soda.

Acetic Acid we have lately treated very fully, and we, therefore, have no need to add much to what we then said. The glacial acetic acid of the pharmacopœia will neutralise the soda solution in the proportion of 60 to 1,000, while of the ordinary acetic acid 182 grains are required. The officinal glacial acid is to have the specific gravity 1·065 to 1·066, which, as also explained by us in an article devoted to the subject a little time ago, is stated to increase in density by the addition of ten per cent. of water. It is further stated to crystallise when cooled to 34°, and to retain its crystalline form till its temperature is raised beyond 48°.

The solutions of ammonia are two in number — "solution of ammonia" and "strong solution of ammonia"— of the specific gravity ·959 and ·891 respectively. Their strength is ascertained by the volumetric solution of oxalic acid, of which one thousand grain measures is required to neutralise 52·3 grains by weight of the strong ammonia, or 170 of the weaker solution. This standard solution of oxalic acid is very useful, serving, as it does, from the constant action of the crystals, as a special standard to which many other solutions may be referred or calculated from. It is made by dissolving 630 grains in distilled water to the bulk of 10,000 grain measures.

Passing now to solutions which are less recognised articles of everyday sale, we have acetate of soda, phosphate of soda, sulphate of iron, and carbonate of ammonia, the three first named being ten per cent. strong, but the last five per cent. The chlorides of gold and platinum need not be described; the usual method of keeping them cannot be improved upon. This exhausts the useful solutions to be found in the officinal list; but there are other chemicals used by photographers which are far more easily used in solution than in bulk. We may name, for example, citric acid and pyrogallic acid. They will be found most useful kept in solution. While holding a decided preference for uniformity of strength in stock solutions, we make in our own practice an exception with these two chemicals, owing to the fact that the pyrogallic rapidly changes when dissolved in water, and the item of alcohol becomes expensive if used too freely. We, therefore, when opening one of the well-known ounce bottles of "pyro.," at once dissolve it in spirit to make up a bulk of four ounces of solution, each drachm of which contains as near as may be seven grains of pyrogallic acid. For wet collodion work when intensifying with pyro. we find it convenient to use an equal weight of citric acid, and we therefore make the citric acid solution of similar strength, so that a small quantity of intensifier is instantly extemporised by adding an equal measure of each of these two solutions to a suitable quantity of water—a plan we advise all to adopt who have not done so already. The scattering about of a few filaments of the pyrogallic is liable to occur if it is constantly handled in its usual form, and nothing is more likely to lead to spots and stains.

Solution of Hyposulphite of Soda and Sulphate of Iron are not at all novelties; they have long been recommended to be kept in saturated solution—a plan which is certainly easy in theory, but practically far from it. A saturated solution of a crystal will not form by mere standing unless the crystals are suspended on the surface of the fluid, a considerable amount of shaking being required if they are merely placed in a bottle and allowed to sink to the bottom; in fact, we doubt very much if in one case out of twenty a so-called saturated solution approaches that state within ten per cent. Hence we should always recommend a given weight of the crystals to be dissolved in a definite quantity of water. It is more scientific, systematic, and far more conducive to that exactitude which should always be aimed at in all photographic operations in their scientific aspect, and which it is our wish and endeavour to inculcate.

In connection with the description in the Paris correspondence of Professor Stebbing's apparatus for the precipitation of emulsions, we notice that the precipitation is performed by hot water. In an article in our Almanac for the current year, Mr. H. G. Rogers, of Naples, also recommends the same course. Now, though the operation is performed with greater certainty, and independently of any special quality of the pyroxyline when hot water is employed, and the product is more easily collected, it will be found that with most samples of pyroxyline a serious loss of density is incurred when the powder is re-emulsified. Why this should be so it is impossible to say, unless some portion of the pyroxyline which is specially favourable to intensity is soluble in hot and not in cold water. We were formerly under the belief that the result was due to the partial removal of some of the organic silver compound, but we have had reason to alter that opinion recently, as we have failed entirely in discovering the slightest trace of silver in the waste liquid remaining after such precipitation. It is rather remarkable that, while the majority of samples of cotton lose density in this manner, we have occasionally met with one which exhibited not the slightest difference in character upon re-emulsification, whether hot or cold water were used. A sample made by ourselves was found to possess the property of withstanding the effect of hot water, but a second batch made from the same formula was totally different in that respect, though unchanged in general qualities. There is another fact which renders the matter more difficult of explanation: if the cotton itself be precipitated with hot water and then emulsified no loss of density ensues, unless hot water be again used in precipitating the emulsion. It would seem that, if the loss of density depended merely upon the solubility of a portion of the cotton, it should be immaterial whether the heat were applied to the cotton by itself or in the state of emulsion. The appearances, however, would suggest that the silver compound is involved in the change; it certainly is not dissolved out, but we may suppose it to be robbed of a part of its organic matter by some sort of decomposition under the action of the hot water.

OUR APPARATUS.

No. I.

In anticipation of a coming season most photographers overhaul their apparatus, and make the requisite alterations and repairs rendered necessary by past work and modern improvements. Intending photographers debate upon the kind and quality of the apparatus they will use; and for the benefit of these last, more especially, I propose to devote a few short articles to apparatus, noticing such matters as I have found in my own experience useful or otherwise.

As a preliminary remark, would-be photographers must make up their minds to rely on themselves, and not exclusively on their apparatus, for the production of good work; and, as far as practicable, I would suggest that they should construct their own of any suitable materials that may be at hand, for the double purpose of gaining a thorough knowledge of the whys and wherefores of construction, and the power of repairing a breakage or extemporising something else if the orthodox apparatus gets out of gear. Many may, perhaps, think that the royal road to perfection is sufficiently well paved to exonerate them from the trouble of noticing or caring for the thousand-and-one little things that are so essential to success. For my own part, I believe a thorough knowledge of the principles involved, and of the modes and requirements of the work, however seemingly insignificant, will lay foundations with which the full-blown photographer will never regret having had a full acquaintance.

The drudgery (if I may so term it) of photography will, as in any other business, secure a solid basis for refined and finished work afterwards, and in it, as in chemistry, to which it is so closely allied, the initials "S. A." are pregnant with meaning—a formula to be compounded. "S. A." suggests that some peculiar care must be taken in putting it together, and presupposes the compounder to be fully acquainted with the mysteries of his art. I am afraid the *secundem artem* to many photographers would convey no hint at all, for this reason—the royal road to photography is the only one they have travelled, and which is constantly leading them into morasses and quagmires out of which, with much waste of time and material, they may manage to struggle, or somebody lends a helping hand (for a consideration) and they are extricated for the time; but their notions of how to prevent a recurrence of the difficulty are considerably "mixed," and the chances are that they plunge in again before very long—another extrication, another compensation, till by a series of disbursements and annoying failures the right plan for avoiding the trouble is eventually learnt.

An excellent photographer of my acquaintance made himself a proficient in the art without the assistance of the apparatus-maker. He constructed his own cameras and made his own chemicals, guided chiefly by Hunt's *Manual of Photography*—one of the *Encyclopædia Metropolitana* series; and it was not until he had in a great measure mastered the art that the experience and information derived from other workers helped him along. But in that struggle to help himself he laid a foundation that was of immense importance to him in after years. I, therefore, cannot too strongly urge upon photographers *in esse* to well learn the little things before they attempt the higher flights of the profession. In doing so they will incidentally acquire a vast amount of information that will be extremely useful to them in other arts than photography. It may also be borne in mind that a *good* photographer will, with the most homely materials, make a good photograph, whereas one who has only a superficial—therefore defective—knowledge will with the most elaborate outfit that ever was made produce but rubbish. With these remarks we will proceed to examine our apparatus, beginning with the

Bath-holder—

those for studio work, and those for travelling, or outdoor work.

For the studio nothing can supersede glass. In the dark room the most convenient way of placing it is by sinking a well in the counter (a plan frequently described), to be covered from dust and dirt by a hollow lid sufficiently deep to allow for the projecting end of the dipper, which should be long enough to be conveniently held and used. A hook or projection may advantageously be fixed to the back of the dipper to rest on the bath and prevent it from disturbing any sediment that may have accumulated.

In selecting the holder one should be chosen with the sides slightly curved *outwards*. They vary much in this respect. If straight or curved inwards there is a great probability that the film will be damaged in either removing or placing the plate in the solution by its scraping against the curved surface. In most cases one side of the holder is curved more than the other. The straightest side should be placed for the back, as with a fairly smooth and concave surface presented to the film there is little or no danger of damaging it. The dipper for general use is best made of ebonite, those made of glass being frequently broken and too fragile for use by any but the *most* careful workers, introducing a risk both to plate and bath-holder.

Horizontal baths, swing or otherwise, are, perhaps, the *very* best that can be used, no dippers being required. The plates can be thoroughly drained and silver solution economised. They are easily made and easily kept in repair. The only objection that can be raised against their universal adoption is the space required for their use—in many dark rooms a very important consideration, there being no room for the most trivial addition; in fact, the laboratory, which should be one of the most convenient rooms in the establishment, is frequently the opposite. However, this subject will be considered subsequently, under the head of "Dark Rooms and Tents."

For outdoor work the glass or ebonite holder must be contained in a wooden case with a watertight top—ebonite by preference, on account of lightness. Care should be taken that the pressure of the screws is exerted not only on the rim of the case, forcing the bath down against the bottom of it, which is the general way, but is distributed by two thin metal bands that entirely surround it and remove the pressure from the bottom, which will, after a time, owing to the corrosion of the screws, give way, and no amount of screwing down will prevent the solution from leaking out during a journey.

If glass baths be used the bottom should be lined with pure india-rubber—not less than an eighth of an inch thick—which will not injure the solution or break the plates if they should accidentally slip off the dipper. As one of the most important pieces of the photographer's outfit he should never trust it beyond his own control, or the probability is that it will "come to grief." It should always be carried separately from the rest of the apparatus when filled, and never packed in a box with other things; for the chances are that the jar and vibration during transit will loosen the screws and let out the solution, no matter how tight they may have been made at the outset.

Cameras.

With respect to cameras, whether for the studio or the field, the fewer loose pieces about them the better; screws will get misplaced, and loose pieces are frequently out of place when wanted. "A place for everything and everything in its place" is a rule hard to enforce. With regard to weight or solidity of construction: the rule of convenience is the only one to be studied. All, unless very small instruments, should focus from the back, and possess rectangular bodies. The cone-shaped bellows are frequently (in these days of short-focus lenses) very much in the way and troublesome to manage, part of the fold of the bellows cutting off the light from the side or end of the plate, so damaging the picture. When lenses of different lengths of focus are used this will from time to time occur, to the great annoyance of the user. In case a camera of this description has to be used the bellows should be carefully pressed forward towards the lens, and wedged in position, if they will not retain it without, as soon as the image is properly focussed. For studio work alone the sliding body is to be preferred, and is the most useful, as it can be used equally well for copying or portraits. The parts can be entirely separated to lengthen the focus, and the open space thus left can be made light-tight by a couple of laths and a dark cloth. Of course this is impossible with the bellows-body arrangement.

E. Dunmore.

CARDBOARD SLIDES FOR GELATINE FILMS.

[A communication to the Liverpool Amateur Photographic Association.]

Since our last meeting I have employed my leisure in further efforts to diminish the weight and frangibility of the tourist's photographic *impedimenta*, and I have jotted down a few notes of the result attained in the hope that they may prove of interest to our meeting tonight.

Which of us who has enjoyed the pleasures, or mourned over the discomforts, of photography in the field has not at times discovered to his horror that the focussing-glass has met with an accident, and can in nowise be replaced by impromptu ingenuity? This misfortune has befallen me on more occasions than one, and I am, therefore, in a position the better to appreciate the chance discovery of an efficient substitute for ground glass for the use of the tourist. No one would desire to supersede the ordinary focussing-screen in the studio; but something lighter and less breakable is clearly a desideratum for out-of-door work. The focussing-slide before you was made by myself at the cost of about threepence, and it combines the qualities I have mentioned above. The following are the necessary directions for the production of a slide 9×7 inches:—

Soak fifty grains of gelatine in one ounce of water for a few minutes; add one drachm of fresh ox-gall and one drachm of skimmed milk. When dissolved by heat and thoroughly mixed pass through the filter, and flow the solution over a clean and dry glass. Now place the glass upon a level stand, and pour the remainder of the gelatine upon it before the first coating has had time to set. As soon as it can be raised, it should be placed in a current of air and allowed to dry where no dust can settle upon it. A piece of moderately-thick cardboard is next to be divided with rule and compass into (say) four sheets of the required size; and from each of these the centre is to be removed with a sharp knife, so as to leave a margin on all four sides of half or three-quarters of an inch in breadth. Three of these pieces are now to be superimposed, closely glued together, and placed under a weight till dry. I have named three as the number of layers to be used; but this obviously depends upon the thickness of the board, and the depth of the dark slide from the surface which touches the camera to that of the sensitive plate. As soon as the gelatine and cardboard are dry, insert the point of a knife round the edges of the former, and strip it from the glass plate. It may now be trimmed with a pair of scissors to the required size, so as to overlap the edges of the aperture in the cardboard by about three-eighths of an inch. Allow it to lie flat upon the glass, and bring down upon it carefully the surface of the thicker cardboard frame, upon which some strong paste has been sparingly spread. The whole may now be raised, the remaining cardboard pasted upon the gelatine, the white surface bound neatly with leather or dark paper, and you have a focussing-slide which will bear any reasonable amount of wear and tear, and which will weigh hardly as much as the glass of a slide of similar size.

In order to give additional strength to the whole it will be well to pierce each of the corners and insert a small brass paper binder with double points before the final leather or paper covering has been employed. To prevent warping it is better to place a considerable weight upon the slide for some hours.

The cardboard dark slide I now produce has been prepared for use with my sensitive gelatine films, and is, as I have ascertained by frequent experiment, perfectly adapted for its purpose. The size of my wooden slides is $7\frac{1}{2} \times 5\frac{1}{4}$ inches, and accordingly, for a single slide, I cut with a penknife a sheet of cardboard of these dimensions to form the bottom of the slide. I next prepare a number of strips three-eighths of an inch wide, a number also of one-quarter of an inch in width, one piece of the size of the bottom with an aperture $7 \times 4\frac{1}{4}$ inches, and another piece to form the shutter $4\frac{1}{2}$ inches wide by 8 inches.

The building-up of the slide was easily accomplished as follows:— Sheet No. 1 was placed on the table and three-eighth inch strips glued upon three sides of its upper surface, the opening in the fourth side being designed for the insertion of the sensitive sheet. Upon these strips half-inch widths were fastened, and the vacant side of the first layer was bridged over with a half-inch strip of board. Next followed three sides covered with the three-eighth inch strips, the vacant end being left for the admission of the shutter. Lastly: over all I glued the piece containing the aperture; the shutter was cut from the cardboard and fitted into its place, the whole was covered and made neat with black paper and colour, a weight superimposed for the night, and in the morning I found myself possessed of a fairly-effective dark slide, of home make and of inappreciable cost. When the sensitive gelatine has been slipped into its place, I have a small piece of black card ready, which I insert from the inside, in the opening through which the gelatine has been passed.

This dark slide was so easily made, and proved so efficient, that I set to work and made a double one of the same description, and also a double one for use with glass plates. The latter is not yet complete; but you will see that it has sufficient stability and strength to answer its purpose, and the method I have adopted for securing the sensitive plate in position without admitting light seems to me to be ample and satisfactory. H. J. Palmer, M.A.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

They manage some things better in Scotland, if we can accept statements made at a public meeting attended by those who were in a position to controvert them had they been untrue. It appears that the Edinburgh Photographic Society contrives to exist upon an annual subscription of only five shillings from each of its members. Not only does it exist upon this modest sum, but it actually "waxes fat" upon its small annual increment, for it appears that the committee are about to present an excellent photographic picture to every member. Now, there are two photographic societies in London, one of which secures from each member the sum of twenty-one shillings as his or her annual subscription, with the addition of a second guinea as entrance fee for each new member; the other society confines its subscription to the more unpretending sum of half-a-guinea, which is still more than double the Edinburgh "figure," but neither the one nor the other can manage to give a presentation print to its members. True, the society representing the smaller of the two sums mentioned *does* occasionally present its members with a picture, but such presentations are "few and far between," and are of a sadly retrospective character even then. In what way the prudent north countrymen arrange their financial affairs so as to do so much with so small a subscription is unknown to me, but it is exceedingly desirable that they would infect the conductors of the metropolitan societies, in order that they may be seized with a similar malady.

Observing that the subject of silvering glass by modifications of the Drayton system has been again introduced by the Editors, I am reminded of a pretty experiment that was once exhibited, many years ago, at the Royal Institution. Two large plates of glass are joined together by the margins in such a manner as to form a bath not unlike the photographic vertical dipping-bath for negatives. This is open at the top for the reception of as much fluid as suffices to nearly fill it. All things being in readiness, the bath is filled with a clear and well-filtered solution of silver, and mounted upon a table in the middle of the room in such a manner as to enable those who look through it to see distinctly those on the other side of the thin plate glass tank. The lecturer now adds the reducing agent, directing the spectators to keep their eyes on their neighbours on the other side of the vessel, which, owing to the limpidity of the liquid, they are in a position to do very easily. No sooner is the reducing agent added than the objects of their attention gradually disappear, and each spectator sees only his own face reflected in the perfect mirrors which each side of the glass vessel has now become.

If collographic or any other kind of ink photographic pictures of jewellery be printed upon bronze paper, it is evident that in this class of work the jeweller or worker in any description of metallurgical art will find a powerful ally in the production of specimens yielding perfect pictorial representations of such art. I was interested in reading the account of M. Leon Vidal's photochromie, and at once saw in such a process of printing the "very thing" that commercial travellers must highly appreciate, inasmuch as the perfect form of any article reproduced in all its delicacy of light and shade would be allied with the very metal of which it was constructed. I read several months ago of gold chains having been photographed, and then printed upon yellow paper by the heliotype process in such a manner that the ground upon which the chains were represented was all made black or dark, leaving the "counterfeit presentment" of the article in various shades of yellow. Obviously, by making use of a gold-bronzed paper for this purpose, instead of a plain yellow paper, the illusion would be magnified in a corresponding degree. Thinking over the possibilities of this and cognate applications I have been led to try the effect of printing a fish upon a piece of silver-bronze paper, supplementing the natural lights and shadows of the *quondam* denizen of the deep by slight washes of colour. The effect is quite magical. The scales of the fish—a salmon—glitter like silver, and the irridescent sheen and play of colours are quite wondrous.

I have already alluded to the silvering of glass. I do so once more because the recent publication of the article on the subject in the Journal, coupled with the exhibition of a photograph of the sun

* Concluded from page 101.

at the last meeting of the Photographic Society of Great Britain, brought somewhat vividly to my recollection certain experiments in taking solar photographs which I made several years ago with optical appliances of the most primitive kind. In a former one of these "Notes" it was placed upon record that a photograph of the sun could be obtained by making use of a simple concave spectacle lens of long focus, using it as a reflector. One side of this lens must be roughened on a piece of sandstone and coated with black varnish; the other then acts as a reflector, by which an image of the sun is produced. It might at first be imagined that too small an amount of light would be reflected from this plain glass surface; but when I state that a wet collodion plate has been impressed with an image in less than the twentieth of a second, the picture being over-exposed, it will be seen that the amount of light reflected is by no means so inconsiderable as might be imagined. Having during the past week obtained a glass one side of which was ground to a curve of longer radius than any I had previously seen, and having ascertained that owing to its long focus it gave an image of the sun exceeding in diameter any that I had previously obtained by similar means, I roughened one side, as before described, and upon the other I deposited a thin film of silver. This produced a reflecting surface of exquisite delicacy and perfection; but to ensure the removal of marginal errors I reduced, by means of an annulus of black card, the reflecting diameter of my little mirror to somewhat over half-an-inch. At the time of writing this I have not taken a photograph of the sun by its means, but I have focussed the solar image, and find it so sharp that I have no doubt that when I do expose a plate I shall obtain, in the sixtieth of a second, a fully-exposed negative sufficiently vigorous to bear being enlarged up to three or four inches without apparent loss.

DIRECT PRINTING FROM GLASS NEGATIVES, USED FOR PRODUCING LINEAR REPRODUCTIONS OF VIEWS FROM NATURE AND FROM LICHTDRUCKS.

A communication which I made in 1876, respecting printing from glass negatives, was received with great interest in Berlin photographic circles, and from many quarters requests to sell the process reached me; but I could not make up my mind to do so, as I intended to work it myself, though circumstances have as yet hindered me. As, at the request of Herr Reising, the subject was lately broached again at Berlin, I shall throw a little light on the matter, and, for the benefit of those who busy themselves with similar experiments, shall publish the process and its applications for the general use.

Usually, in order to render negatives printable, they are coated with a solution of chrome gelatine when they have become perfectly dry. Thus one always gets a film of bichromated gelatine *above* the collodion film. It is also perfectly well known that by exposing such negatives to diffused light the lines become somewhat broader, because, even when the film is thin, the light works in from the sides. Towards the end of 1875 I tried to prevent this by forming a film of bichromated gelatine *in* the collodion negative film. In this attempt I succeeded completely, by taking the negative immediately after development, without drying it, fixing it, and washing it with water, and, *while still wet*, placing it in a thin solution of bichromated gelatine. When dry the upper surface was matt, and there was no coating of gelatine to be seen, though the collodion film had absorbed a sufficient quantity of gelatine and bichromate to render it printable after exposure to light.

Now, in order to produce with advantage such plates, in which, so to speak, the collodion films are rendered capable of being printed from, I proceed as follows:—Having developed, though not very powerfully, in the usual manner a negative upon an albumenised glass plate, and having fixed and washed the negative, it is placed in a solution previously prepared thus:—4·5 parts of gelatine are put to soak in water, and then, the superfluous water being poured off, fifty parts of distilled water are added, and it is allowed to melt; a solution of 5·5 parts of bichromate ammonia in one hundred parts of water is then added, and the whole heated to 60° R. The plate remains about five minutes in this bath. If large plates be used the solution may be poured over them, but then, before coating, the plate must be quickly rinsed with a little slightly-warm water, and the coating with the gelatine solution must be frequently repeated. A sufficient quantity of the solution being poured upon a plate, the latter must be warmed in a horizontal position over a spirit lamp. If fumes rise from the solution lift up the plate for a moment; then warm it again in a horizontal position until it becomes quite dry, but do not let it become so hot that the palm of the hand cannot easily be drawn across the back of the plate.

As the duration of the exposure of such a negative can never be exactly measured by merely looking at it or by using the common photometer, having well washed the back of the prepared negative I take a piece of sensitised albumenised paper, or paper prepared with a solution of a bichromate, and place it upon the film side of the negative; then, placing the whole in a frame, light through the glass. With the aid of this simple expedient I can always ascertain how far the action of the light has gone, cover parts that are too dark, and so on; but this requires skill, as in silver printing. Of course I use a black backing, in order to prevent any reflection of the rays of light. By this process, however, in spite of the white albumenised paper, reflection is little to be feared, as the chloride of silver absorbs all the rays of light.

When the finest lines of the image are distinctly visible, the ammonium bichromate should be washed out by laying the plate in cold water, and, when dry, the negative may be handed to the printer. For printing the finest rollers should be used. When damping it is advisable to put a little gum arabic on the edges, and to rub the surface of the picture with it. With regard to the preparation of the negative, I may mention that every collodion does not take up the same quantity of chrome gelatine; indeed, many do not absorb the solution at all, and with such one only gets a gelatine film *upon* the collodion film. The lithium collodion prepared by Dr. Kurz, of Wernigerode, is the best suited for this purpose. I believe that the lithium salt in this collodion plays a not unimportant *rôle*,* but as yet I have had no opportunity of experimenting in this direction.

Not only does this process furnish linear reproductions with the greatest delicacy in the lines, but it can also be made very useful in the case of photographs from nature.

It is principally for portraits that direct printing from the glass cannot be employed, since it does not admit of retouching the negative. Still, if a negative be prepared in the manner directed above, but only exposed until the shadows of the picture have become visible on the albumenised paper, and if the negative be then washed with water whose temperature is continually increased until it dries up, the negative will bear any required degree of retouching with a No. 2 Faber's lead pencil, and then with fine graphite rubbed on with a stump. If for such special cases a rough surface should be desired, add to the heated gelatine solution twenty parts of spirits of wine in which is dissolved one part of colophonium. When the necessary amount of retouching has been done coat the surface with a dilute solution of ammonia, and when that has dried let a coating of albumen and water-glass (such as Professor Husnik has repeatedly described) follow, and then employ the process described at the same time by Professor Husnik, or any other good lichtdruck process in which sheets of prepared albumenised paper are used instead of a scale photometer.

By the process just described lichtdrucks in several colours (chrome-lichtdrucks) may be produced by taking as many negatives of the subject in question as there are colours to be printed, and treating the negatives by the first process. All the parts that are not required are then worked out with a stump and graphite, and the outlines with lead pencil. With a certain degree of practice it is not necessary to prepare separate plates for the secondary colours, like green, orange, and violet, as by covering the parts more or less with stump it is possible to obtain with ease the most beautiful transitions and mixtures of tints. With the assistance of the bits of albumenised paper one may make any change during the exposure that may be thought desirable. Since Albert's process cannot be used by everybody, the process I have just described may yet find many uses. Hans Brand.

—*Photographische Correspondenz.*

FOREIGN NOTES AND NEWS.

Varnish for Melainotypes.—A Novelty in Test Papers.—White Pigment Tissue.

The *Photographisches Wochenblatt* gives the following directions for the black backing of ferrotypes or melainotypes:—Cut the iron plate to the proper size and heat it to about 80° R. Then brush upon both sides of the plate the following varnish:—

Alcohol	100 grains.
Yellow gum lac	10 ,,
Sandarac	5 ,,

The mixture should be slightly warmed for half-an-hour in a glass

* Apart from the fact that the metals combined with the halogens exert an undoubted influence on the greater or less fluidity of the collodion, it is very possible that in the case in question the quality of the pyroxyline may exercise a real influence.—Ed. *Ph. Cor.*

vessel, and the clear part decanted off. The black varnish, with which one side of the varnished plate is to be coated, consists of—

Chloroform	80 grains.
Asphalte	80 ,,
Canada balsam	20 ,,

When in the course of a few days the varnish has become perfectly dry the plates may be used, but it is as well to dip each of the four edges into the above solution, a sufficient quantity of which for the purpose has been poured into a groove made in a piece of wood. The object of this is to prevent the varnish from slipping off the edges of the plate and thus permitting the iron to come into contact with the silver bath and spoiling it. Before collodionising rub the plate with a tuft of cotton wool to remove all dust. The most suitable collodion is lithium collodion, which contains a little free acid. The developer is—

Water	500 grains.
Glacial acetic acid	30 ,,
Alcohol	30 ,,
Sulphuric acid	30 ,,

Intensify and fix as usual.

From the *Correspondenz* we learn that Herr Dieterich, of Dresden, has introduced a novelty in test papers. By means of a machine, parallel stripes of red and blue litmus solution are run down the same sheet of unsized paper. The sheet is then made up in books, each leaf of which has one edge red and the other blue, so that the preliminary testing of solutions for acid and alkali may be done simultaneously. The object of this contrivance is, of course, to save time; but it is to be feared that in this case the saving, minute as it is, will be effected at the expense of accuracy.

Herr Honikel, of Leipzig, has, according to the *Wochenblatt*, proposed the following amendment of the carbon process:—Starting from the assumption that the shadows and half-tones of all carbon prints are uncommonly rich in details, while the lights and high lights are extremely poor, Herr Honikel proposes that instead of mixing black or dark colouring matter, as has hitherto been the custom, with the gelatine destined to form the pigment tissue, white pigments should be used, and the sensitive tissue exposed under a positive and developed, and transferred to black or coloured paper. Besides the more beautiful appearance claimed for such pictures, this method is said to possess the advantage of indefinitely increasing sensibility. According to Herr Honikel the sensitiveness of white pigment tissue is from twenty to twenty-five times as great as that of ordinary carbon tissue. And yet another advantage claimed is that by means of white pigment tissue it is possible to produce direct enlargements upon paper with the camera. It is scarcely necessary to remind our older readers that the late Mr. William Blair devoted much attention to this kind of pigment printing, an account of it having been published by him nearly ten years ago.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 12	Great Britain	5A, Pall Mall East.
,, 13	Glasgow	172, Buchanan-street.
,, 13	Cheltenham Amateur	Savings' Bank.
,, 14	Manchester	Memorial Hall, Albert-square.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The monthly meeting of this Association was held on Thursday evening, the 28th ult., at the Free Library, William Brown-street,—Mr. H. A. Wharmby, President, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. B. J. Sayce and Mr. Arthur Hall were elected members of the Association.

The Rev. H. J. Palmer exhibited a scenograph to which he had invented a base-board giving perfect rigidity, and which could be used on any stand. He (Mr. Palmer) then read a paper on *Cardboard Slides for Gelatine Films.* [See page 110.] In illustration of his paper Mr. Palmer exhibited gelatine films as substitutes for ground glass, new non-actinic muslin, and some simple cardboard dark slides for the scenograph.

Mr. J. H. T. Ellerbeck suggested that the latter would be stronger and stiffer if made with what was known as shalloon board, which was much harder and thinner than cardboard.

Mr. Palmer said that at the last meeting he had been unnecessarily abusive on ox-gall. It was quite usable when fresh, but he found it to vary. The best plan was to purchase the gall in the bladder and suspend it in a cool place for a day or two, by which time the filmy mucus sank to the bottom; the ox-gall on the top could then be used without filtering. It was also paler in colour, and thus better.

Mr. Ellerbeck then passed round a number of Mr. C. Ferranti's artistic studies, which had been lately so favourably reviewed in the photographic journals. Many of these were exceedingly beautiful, and, though some might object to their highly-polished, glass-like surface, it was no doubt in consequence of this surface that the brilliant tones and permanency of the pictures were secured. He (Mr. Ellerbeck) then read the following communication, which excited considerable amusement by the manner in which he had contrived to bring into use the names of the members of the Association:—

Our Society.

Some time ago one of our members remarked that during the whole of his attendance at our meetings he had never seen a smile on the face of any present. This struck me as such an unenviable reputation that I suggested a comic song; but he, being perhaps the most solemn of us all, declined. The wish to infuse a little more liveliness into our meetings is my only apology for the abominable play upon words in the few lines I have to offer.

As the leading amateur photographic society in England we ought to be proud of our position, eclipsing as we do even the aristocratic Londoner. Have we not tonight a new Hall? A King has led us to the field; a Banner floats on our outer wall—aye, two (Whalley). Do we not recognise the abilities of our Castellain to guard the gate—our Clarke to give us safe advice in trouble—our Cooke to look after the inner man? The Potter's art is frequently in requisition, and the Palmer relates round the fire stories of his travels in the land of the Bruce. Let us further see what we have to boast of. Stretching lazily in the sun as far as eye can reach the Shannon waters our land, skirting the Greenwood and the Moore. There cattle free from murrain (Murray) seek the river and Wells. In a secluded spot is the Kirk by the Green meadows, where a grave has been dug—a whole grave (Houlgrave)—in which a man can, if he find his pen dull, bury (Pendlebury) the work of his brain. (It's a pity a large proportion of our would-be authors don't do it, or practice cremation.)

Still generation follows generation—Will's son follows William's path, and a warm boy (Wharmby) he is. Roberts and Robertson, John's son and Parkinson follow in the footsteps of their 4 fathers, and thus the good work is perpetuated. By-the-bye, it is a remarkable fact that, though we have such a great Forrest, it is transparent as glass, bearing only a single Twigge, so that we have, even in its deepest recesses, no difficulty in seeing the heavens (Evans) above—a great consideration for photographers. I should like to make a suggestion: it is that we admit to our ranks any lady who may wish to join us. We promise not to tire her (Tyrer), and though we cannot offer her a tirewoman, we can provide a Tyerman. But what would be Seddon such an occasion? One might feel inclined to put a rope around (Roper) *his* neck whoever suggested the idea, only we Houghton to. But I'm getting rather Heyes y on this point, and when a mans *led on* (Sleddon) to make such remarks as these the sooner he stops the better. Was it not in Pickwick Sam wEller beckoned to the Rev. Mr. St Higgin s whispering the advisability of "drawing it mild" and nothing Riley d him so much as humbug with a long tongue (Longton). We would soon get Hughes to the ladies and not go Spoon(i)ly paying too much attention to the fairer members unless at our annual *soirée* we could Danson the "light fantastic toe" to the tune of Weber's last waltz—they in ball costume, flowers looped on (Lupton) their beautiful tresses, or Dod ging their partners through the intricate mazes of the polka rejoicing at kin dred feelings awakened. What ling ering glances! what soft speeches!

I have again to apologise for reading such rubbish as this, fit only for a booth rodomont (Boothroyd), but it was conNiven at by our Secretary; so I thought I would bring it as it was the Best I could do, and *say* something (Sayce) that might amuse though it won't instruct. I hope nobody will be offended at being left out in the cold. There is one I can't introduce except in the old saying—if Phipps and haws were little jackdaws, there'd be no work for tinkers. This does not seem to be the correct saying, but Mauds lying down as I write this, and I don't like to disturb her to ask which is the right one.

"A little nonsense now and then
Is relished by the wisest men."

Mr. Ellerbeck also exhibited a knapsack for camera, &c., which was arranged so that the weight shall rest on the back instead of on the shoulders.

After votes of thanks had been passed to Mr. Palmer and Mr. Ellerbeck, a number of slides taken by Mr. Potter, Mr. Kirkby, and the Secretary were shown by aid of the lantern, and the meeting was then adjourned till the 28th instant.

PHOTOGRAPHIC SOCIETY OF VIENNA.

This Society met on the 23rd January, Dr. Hornig occupying the chair as usual. The minutes of the previous meeting having been read and approved,

The Chairman briefly mentioned the arrangements that had been made for placing the Society's exhibits at Paris, and stated that he hoped to get Herr Winter's imitation Gobleins hung as wall decorations in another part of the building apart from the other photographs.

The prize jury then gave in their report and made the following awards:—

I. *Voigtländer Prizes.*—The Voigtländer silver medals were thus awarded:—1. For lantern slides adapted to educational purposes, to the competitor whose motto was "Much pain, little gain." 2. To Dr. Simony, for his dry-plate views in the higher Alps and in the Dachstein region. 3. To Dr. Heid, for his excellent home-made collodion cotton. 4. To Herr Winter, for his applications of enlargements to decorative purposes, especially for his imitations of Gobleins. 5. To Herr Max Jaffé, for his photolithographic and lichtdruck polychrome combination prints, and for his endeavours to apply photography to manufactures. The Voigtländer bronze medal was awarded to Herr von Stefanowski, for his efforts to popularise the carbon process. The work, which arrived late, but was admitted to the competition by a resolution of the meeting of the 11th December, was not considered suitable by the jury, and had, therefore, no prize awarded to it.

II. *The Society's Prizes.*—Dr. Bauer, Prof. Husnik, Herren Martin, Leipold, and Scamoni—the experts who were asked to give their opinion of the *Treatise on the Reactions of the Chromates*, signed with the motto "*Si quid novisti rectius istis, candidus imperti; si non, his utere mecum*"—reported that the paper in question was a very elaborate treatise, based upon diligent study of technical literature and upon exact experiments on the reactions of chromates on organic substances, especially gelatine. They, therefore, recommended that the gold medal, valued forty ducats, be awarded to the author of the treatise, and that, further, a money prize of one hundred ducats should be added if the author would undertake to complete the elaboration of the subject in one direction, and to arrange the whole subjects under distinct heads. The Society's silver medal was awarded to "Helios" for the excellence of pose and arrangement of his *genre* pictures, and for the success with which he had printed them in carbon.

On opening the envelopes with the mottoes it was found that the one on which "Much pain, little gain" was inscribed contained the name of Herr von Reisinger; that Herr Täschler was "Helios;" and the author of the treatise with the motto "*Si quid novisti*," &c., was Dr. J. M. Eder.

The Chairman reported on the progress made by the Society during the last year and the present state of its funds.

Baron Schwarz-Senborn showed some specimens of Whitburn's xylographic process.

Dr. J. M. Eder remarked that Dr. Janecek had lately brought the subject of the restrictions placed on the transport of collodion cotton before a meeting of the Austrian Railway Official Club, and that his lecture had been taken down by a stenographer and reproduced in the *Verkches Zeitung*, where it had made such a good impression that there were great hopes of the oppressive restrictions being removed.

Dr. Janecek showed how slightly explosive collodion cotton is by placing a quantity upon an iron anvil and striking it with a heavy hammer without producing the slightest change in the cotton.

The last matter of business before the meeting was the annual election of office-bearers and council, most of whom were re-elected. Dr. Hornig, who was unanimously re-elected, only consented to act if it were distinctly understood that he was likely to be absent for a few months at Paris. The meeting was immediately afterwards adjourned.

PHOTOGRAPHIC SOCIETY OF BERLIN.*

A meeting of this Society was held on the 19th January, when, owing to the absence of the President, Herr Brasch, and of the Vice-President, Dr. Fritsch, the Secretary, Herr E. Düby, occupied the chair. After reading the minutes of the previous meeting,

The Chairman made the official intimation of the death of M. Adolphe Braun, of Dornach, who was an honorary member of the Society, and the assembly testified its respect for the memory of the deceased, in the usual manner, by rising *en masse*. He (the Chairman) then exhibited a direct portrait, some 40 × 50 centimetres in size, of M. Braun, which his firm had presented to the Society.

Herr Max Kanneberg offered to present the Society with a tasteful frame, so that the portrait might be worthily hung.

The meeting resolved to send a laurel wreath tied with silk, and accompanied by a suitable inscription, to Dornach, to be placed on M. Braun's grave.

The Chairman then placed on the table a number of original and dusted-on negatives, made by Prof. Husnik, of Prague, and accompanied by the following directions for the dusting-on process:—

"Each flagon has Husnik's trade mark, and contains about eighty-five grammes of concentrated dusting-on solution. For use, the contents of each flask should be diluted with three times its volume of distilled water and filtered. The portion first filtered should be poured out, so as to remove any dust that may have been upon the filter or that the fluid may have carried with it.

"In order that the glass plates may allow themselves to be easily coated with the dusting solution they must either have a weak solution of caustic potash or, better still, a dilute solution of water-glass rubbed upon one side, wiped off, and then dusted; and before pouring on the powder solution they must be *strongly breathed upon.* Thus the fluid spreads on the plate like collodion, and the breathing especially facilitates the operation. The solution is to be poured off the glass plate either into another vessel or back into the same one through the filter, only as much being left on the plate as remains there when the plate is much tilted up. The plate is then dried in a horizontal position, by an equal temperature—somewhere between 35° and 40° R.—either over a spirit lamp or a petroleum oven, or in a drying-box. If a spirit lamp be used touch the under side of the plate often with the hand in order not to exceed the requisite degree of warmth, and the operation had better be carried on at some distance from the window. In this way large plates do not dry equally and their development is defective.

* This is not the society presided over by Dr. Vogel, whose meetings are usully reported under the heading of the Berlin Photographic Society, but whose title might be more correctly rendered as the Berlin Association for the Cultivation of Photography.

"A small drying-box is much better, the under part being mounted with a sheet of iron, in the centre of which a horizontal plate is placed, upon which the plates to be dried are laid. Cloth is stretched over the lid of the box, and at the bottom there are one or two small openings made for the entrance of the currents of air. The heat is produced either by gas jets or by a small petroleum stove placed under the box. Great heat during the drying is apt to cause decomposition of the chromium salt, thus rendering the film non-sensitive.

"When the coating of the plate has dried until the edge no longer feels sticky to the touch, the still warm plate should be laid upon the negative, and upon that again a black cloth; it should then be exposed from half a-minute to five minutes in the sun, or from six to fifteen minutes in diffused light. After the exposure—which can only be exactly determined by practice or by the help of a photometer—the image is so slightly visible that it cannot be judged of before development by dusting-on. Supposing the light to have been strong and the exposure to have lasted but from half-a-minute to five minutes, so that the plate has not had time to cool much, one then proceeds at once to dust on the graphite. If, however, the exposure be longer, or the air be damp, or the plate be brought into a warmer room where vapour would be deposited upon it, then it must be slightly, but equally, warmed by the lamp or in a drying-box before proceeding to develope.

"In a dry condition the plate is very sensitive, and must be protected from strong light. The warming of the plate before dusting-on can never do any harm, as it makes it take on the graphite more slowly, and thus makes the development slower, but more sure and finer in tone, and one must watch carefully and compare with the original so as to stop the development at the proper moment. A plate which is too damp and which has not been warmed would take on the graphite too quickly, and become coarse in the grain.

"If, owing to the dryness of the atmosphere, the development proceed too slowly, breathing upon the film will make it take on the graphite more rapidly. Still, this must be done with great circumspection, as by unequal development the picture might easily be spoiled. Parts that are too weak in the original may also be assisted in their development by breathing on them.

"For the development proper use a good stump and Faber's best graphite rubbed down in a saucer to a fine powder, and put on to the plate in considerable quantities by means of a pencil. The graphite may also be worked into the film by the pencil.

"If the exposure be too short the picture developes quickly and is flat; when over-exposed, on the other hand, the picture is hard. Thus one has complete power over the intensity of the picture, and by regulating the time of the exposure and development powerful copies can be produced from weak, and soft copies from hard, negatives.

"If the solution be very old, or the weather too dry, the picture will be too slow in developing, and it will be well to add two or three drops of glycerine to the solution before using it.

"When the picture is sufficiently developed and dusted, it is placed in a flat vessel (containing not too weak alcohol, to which twenty parts by volume of nitric acid has been added) to have the chromium salt completely washed out of it. It should then be dripped and set up to dry, after which it may be varnished. The negative so reproduced will be reversed; but, if it be wished to get a reproduction of a negative in the same position as the original negative, the developed picture should be coated with plain collodion, and, when that has stiffened, a knife should be passed round the edges and the plate laid in a vessel of cold water, to which a few drops of nitric acid had been added. In a short time the collodion film is loosened, and may be drawn off under water by a pair of pincers, turned over, and placed upon another glass plate, care being taken to avoid air-bubbles. It should then be coated with a thirty-per-cent. solution of gum and set up to dry. To render them more durable these copies may also be varnished. The same manipulation may also be applied to reversed negatives, only in that case the plain collodion must be poured over the whole of the plate, edges included; and when the collodion has set the chromium salt must be washed out in acidulated water, the film remaining on the same glass and is not turned over.

"If it be desired to produce dusted-on pictures directly from views taken in the camera the manipulation is the same, only another clear glass plate must be laid upon the dry, but still warm, plate to prevent the film from absorbing moisture during a long exposure.

"Very thin films upon which, after drying, a soft, fine pencil is worked about in every direction give equally good results with Siberian graphite and the ordinary sorts of graphite.

"If blisters or flakes appear while the picture is in the spirit bath, then the spirit is too strong and must be diluted with water.

"The dusting-on solution No. 1 may be treated with the acidulated spirit as well as with the plain collodion. The dusting-on solution No. 2 is best treated with the plain collodion, as in a weak spirit bath the film dissolves off from the glass, but with strong spirit it does good service."

A point of law was next discussed, after which the question-box was opened and a variety of articles placed on the table. The meeting was shortly afterwards adjourned.

Correspondence.

STEBBING'S APPARATUS FOR THE PRECIPITATION OF EMULSIONS.—A NEW REVERSING LENS.—VIEWS IN THE INDRE.—PROCESS FOR DIRECT REPRODUCTIONS.—THE SCIOPTICON.

The ordinary monthly meeting of the Photographic Society of France was held on Friday, the 1st instant,—M. Peligot in the chair.

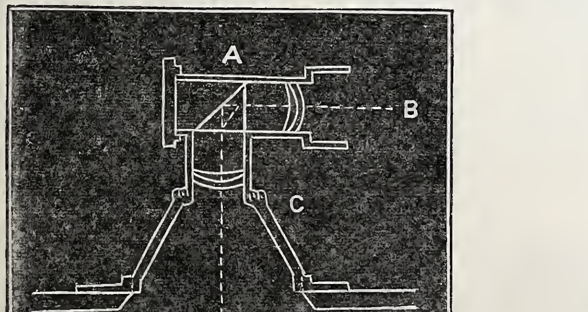
After the election of MM. Castellani and Sauvager, the French and foreign photographic journals were reviewed, and M. Davanne, on behalf of Mr. E. Stebbing, exhibited the apparatus of the latter for the preparation of emulsions—a diagram of which is inserted at page 60 of this year's British Journal Photographic Almanac, which represents the instrument, but several changes have since been made in order to perfect it as much as possible. Precipitated emulsions having at last become the fashion in France, an apparatus was required which would precipitate the emulsion, and at the same time distil the ether and save the alcohol employed in the collodion. After much expense Mr. Stebbing, aided by the suggestions of the ingenious M. Bardy, succeeded in constructing such an apparatus, which has been in constant use in his laboratory for more than six months, and which, with the improvements latterly made, fulfils admirably the duty demanded.

In the diagram referred to *a a* represents a copper boiler having handles on its sides by which to lift it, and near the bottom, at one side, is a tube with a rectangular bend, in which to insert the thermometer. *b b* is an alembic or still, having a broad flange at the top to rest upon the upper edge of the boiler, together with a felt collar to permit the cover being fixed upon it with clamping screws. Inside of this still is a circular vessel of porcelain, having at the bottom a silver thimble, into which is pivoted the lower end of a round shaft bearing a number of arms, now made of silver sheet, of a parallelogramic shape, inclined at a certain angle like the blades of a ship's screw, which act as beaters, the top of the shaft carrying a horizontal toothed wheel revolved by the action of another toothed wheel working perpendicularly to the other, which is turned by hand with the handle adapted to its axle. A funnel and glass tube *d* in the domed cover enable the collodion to be poured inside the porcelain vessel in a fine stream. The pipe *e* is connected with an ordinary condensing apparatus for the condensation of the vapour of the ether thrown off by the hot water.

In order to set the apparatus at work the boiler *a* must be filled about a quarter full of water; the still is then introduced, which displaces the water, and makes it rise to the level indicated; the porcelain vase is then put in and filled about half full of distilled water, and a small quantity of water is introduced between it and the still. The dome bearing the shaft and beaters is then fastened on and hermetically joined by means of clamping screws. The tubular funnel is fastened into the dome by means of a cork, as also the glass tube connecting the apparatus with the ether condenser.

The still being now ready is placed upon a gas stove, and as soon as the thermometer indicates 149° Fahr. the fans or beaters are set in motion, and the prepared emulsioned collodion is poured gently into the interior by means of the glass funnel. In coming into contact by falling into the hot distilled water a great dilation takes place by the rapid evaporation of the ether; at the same moment the cotton of the collodion is precipitated, and is drawn violently downwards, by the inclination of the beaters, towards the bottom of the porcelain vase, and there retained by a stationary silver partition extending from the side of the vase up to near contact with the shelf. The height of the partition leaves space for the lower beater to revolve; this collects the precipitated cotton, preventing its rising to the surface, and there coming into contact with the freshly-precipitated cotton from the continuous stream of falling collodion. The ether escapes out of the dome by the glass tube, whose diameter is large enough to convey it quickly into the cooling apparatus, where it is condensed and collected. As to the alcohol and soluble and miscible salts of the collodion, they are absorbed by the hot distilled water. When the whole of the emulsionised collodion is precipitated, the residue is collected and again washed in distilled water and finally in alcohol, after which it is retained in a damp state until required for use, and final solution in ether and alcohol. The hot distilled water containing the spirits of wine is set apart until sufficient is obtained to pay for its distillation. The precipitated cotton emulsion obtained by this process has a honeycombed appearance, dissolves readily in the solvents, and gives a very creamy and even solution.

M. Perrot de Chaumeux exhibited, on behalf of M. Derogy, optician, what he called an "aplanatic lens," intended for the production of



A, prism. B, axis of lens. C, cone to advance the lens from the camera. D D, camera front.

reversed negatives for the photolithographic and single transfer carbon processes, and which presented, from a photographic point of view, the novelty of a prism placed in the interior of the tube between the anterior and posterior lens at the position of the stop. So the prism need be no larger than the stop required, being thus much smaller than when placed outside the lens, as is usually done, and consequently lighter, of very diminished cost, while giving much better results, for the surfaces of smaller dimensions are obtained perfect with much greater facility. The prism can be replaced by a parallel glass, the silvered surface being thus effectually preserved from the action of the atmosphere and the dangers of handling or contact with the fingers of the operator or other persons. M. Perrot de Chaumeux handed round a *cliché* produced with the lens, the image of which testified to the excellence of the invention, being sharp up to the edges.

M. de Potok had been announced to make a communication in connection with a process for the direct photographic reproduction of black lines upon a white ground. M. de Potok said he regretted that the inventor himself, M. Artique, was not present to explain and demonstrate the process, which would have been more satisfactory to the members; for, being very little versed in photographic manipulations, he (M. Potok) could not do justice to the invention. He might, however, to show that it was practicable, state that the railway company of the Midi paid a royalty of 300 francs a year for its use. M. de Potok then showed some paper which resembled in appearance carbon tissue paper, having a thin film of black-coloured gelatine. This paper was in an inert state, and, to render it sensitive, was placed in a bichromate bath, after which it was dried and exposed under a design or engraving. He then produced an exposed sheet which, he said, had been afterwards inked as in the lithographic transfer process, and, showing the print from a wood block of a rolling-press, proceeded to place gently in a tray of cold water to develope the exposed sheet. In a short time the image appeared—black upon a white ground. M. Davanne, however, observed that this image was a negative one of the print of the rolling-press. In reply, M. de Potok said that was the case, and that there were two ways of producing the positive—namely, one to use the negative first obtained, which would give an unlimited number of positives on being exposed in contact with fresh pieces of prepared paper, blackened *as if with charcoal;* and, secondly, before developing the first print (the negative), attaching to its surface another unexposed sheet by being passed through water, and united together by the action of a squeegee left for ten minutes in contact, and then separated whilst still humid. The one sheet would give on development a negative proof, and the other a positive proof. In reply to a question, M. de Potok said he had not a specimen obtained in this manner to show to the members, which left a doubt on the minds of several of them as to the value of the results, and therefore ocular demonstration is still required.

M. Davanne said that, one or two years ago, he exhibited before the Society for the Encouragement of National Industry, and also in the course of lectures on *Photography* he delivered at the Ecole des Ponts et Chaussees, a process analogous to one which had been shown to him by M. Roger, Director of the Photographic Section of the Museum of Artillery of St. Thomas d'Acquin, which was, in general terms, to the following effect:—A sheet of ordinary salted albumenised paper was floated upon its back on a bichromate bath, dried, and exposed, the back being in contact with a design on tracing-paper, or on drawing-paper rendered translucent in the usual manner so as to shorten the time of exposure. The albumenised paper was now laid on a marble slab and inked all over with the roller; it was then plunged into water, the albumen dissolving off with its covering of ink where the light had not acted, the other part remaining insoluble. This produced quickly, and with very little labour, the print ready for transfer. M. Roger said he inked before or after exposure; and thick, even very thick, drawing-paper gave equally good results. He then transferred the print to stone, when the inked image was immediately produced.

M. Perrot de Chaumeux remarked that M. Poitevin had published very much the same thing; but M. Davanne said that was done in general terms, although he used the words "*albumenoide*" and other "*succeedanées*" for the preparation of his surface.

M. Fleury Hermagis sent for the examination of the members two portfolios full of photographic views by M. Verdot, photographer, of Chateauroux. The most remarkable of these were views of ruins, monuments, and streets in the department of the Indre and in Berry, printed upon dark blue paper, giving very appropriate effects of moonlight, and quite in keeping with the subjects chosen.

MM. Charconnet and Laverne exhibited, for the first time in France, Marcy's and Woodbury's sciopticon, and projected on the screen pictures by MM. Lachenal and Favre, Lamy, and Leon Levy. The additions made to the instrument consisted of the closing up of each end of the lighting chamber with the unbreakable glass of M. de la Bastie, and the adaptation of a cone upon the condensers, having a truncated end, at an angle of 45°, for the insertion of *cartes* and cabinets, and at right angles thereto is screwed on the quarter-plate lens. by which enlargements were made 16 x 12 inches upon collodionised glass with an exposure of thirty seconds.

MM. Teisserenc de Bort (Minister of Public Works), Kranz (Commissaire General), and Georges Boyer (Director of the Foreign Sections), have paid a visit to M. Paul Baudry, in whose *atelier* they have minutely examined the magnificent design he has completed for the diploma to be awarded by the jurors to the successful exhibitors at the forthcoming universal exhibition in Paris. M. Baudry has symbolised "France, Supported by Peace, Protecting Labour" in a noble work, whose artistic merit will contribute a new and additional value to the prizes in connection with which it is to form the certificate. M. Baudry's admirable creation is to be reproduced by MM. Goupil and Co., and a *facsimile* obtained by M. Rousselon's process of photo-engraving, and under his direction. My English readers will learn with pleasure that this engraving process is based, to a great extent, upon the labours of an English gentleman, whose process is alone known in France as the process of "photoglyptie," being no other than that of Mr. W. B. Woodbury. W. Harrison.

Asnières (Seine), Paris.

PACKING NEGATIVES.

To the Editors.

Gentlemen,—Referring to a letter on packing negatives which appeared in your last issue, I would suggest the omission of sawdust as being not only unnecessary but heavy.

Four years ago I brought with me from Calcutta and Simla a quantity of negatives of all sizes, which I placed in the usual plate-boxes, carefully pressing between each negative a small quantity of cotton by means of a thin paper-knife; a layer of carded cotton was then put on the top of the plates, and the lid pressed down and secured by the hooks.

The negatives reached England without mishap of any kind, and it is scarcely possible for heavy baggage to be more knocked about than it is during the overland route from India. Had my plate-boxes been filled with sawdust the enhanced payment for freight would have been a serious consideration in such long journeys.—I am, yours, &c.,

Honiton, March 2, 1878. A. A. Mantell, M.D.

THE CONSTRUCTION OF STUDIOS.

To the Editors.

Gentlemen,—As the subject of studio building is again attracting attention, I beg to offer the following suggestions for the benefit of any who, like myself, are having additional studios constructed.

I observe in Mr. Heighway's work, in which the dimensions of a studio are described, that ten feet is suggested as a most desirable length, and width in proportion. This, I should think, must be intended for the natives of Lilliput, as twenty-five feet is the most useful length on the average, but more if it can easily be obtained; width about fifteen feet; height of the sides not less than eight feet, and, as rather a steep pitch gives the best results, about twelve or thirteen feet to the ridge makes a good form. The room, if the view be uninterrupted, should face the north, and be glazed *only* on the north side, the south and ends being all brick and slate. It is a wonderful advantage to have all the sashes of iron instead of wood.

A system of ventilation, at once simple and effective, may be arranged by opening the two end lights, and having a pair of boards below the side light to swing like Moore's ventilators, thus letting off the hot air above, and admitting a continuous stream of cool air below, but allowing all to be shut off if desired. The bottom of each pane of glass should be cut on a slope towards its centre, to form a medium for letting the rain run down the centre instead of the edges of the glass, thus greatly saving the paint and putty from rotting.

It is an undoubted advantage to have the top lights all of white Hartley's roll, and the sides of British or patent plate.—I am, yours, &c., Arthur Debenham.

Royal Photographic Studio, 28, *Union-street, Ryde, I. W.*,
March 5, 1878.

THE SUBSTRATUM.

To the Editors.

Gentlemen,—May I add the result of my experience of substratums to what you say in your sub-leader on the subject last week? After much and very varied failure with albumen, gelatine, and with india-rubber edging, I have found never-failing success attend the very simple use of cocoa-butter applied as a "super"-edging (if I may thus distinguish it) just before development, as recommended by Mr. J. A. Spencer in The British Journal of Photography last year.

I have not only never found a film thus treated to slip, but have also never experienced any trouble from solutions, such as water, getting under and causing the film to burst. A negative thus secured would obviously offer no obstacle to the transfer of the film, and, as a very narrow edging is sufficient, it does not encroach beyond the limits of the strip of bare glass round the negative, so that there is no unsightly line round the picture, as I have found to be the case with the india-rubber edging.

A notch should, of course, be cut at one of the angles of the piece of cocoa-butter, and applied to the edge of the sensitive plate, rubbing the "butter" well and evenly along each side. The smell of the substance is not unpleasant, and the handling of it tends to fortify the fingers against the action of the solutions. But if desired it would be easy to invent a carrier into which a moulded stick of the "butter" might be fitted.—I am, yours, &c., A. J. Corrie.

5, *Sussex Gardens, Hyde Park, W.*,
March 4, 1878.

THE FORTHCOMING PARIS EXHIBITION.

To the Editors.

Gentlemen,—I send you herewith a copy of a letter I have received from the Secretary of the Royal Commission of the Paris Exhibition which explains itself, and is, I think, a satisfactory answer to Mr. Samuel Fry's inquiry in your last issue, as I presume that the same concession will be made to all British exhibitors of photographs.—I am, yours, &c., William Bedford.

March 5, 1878.

[Copy.]

"20*th February*, 1878.

"Sir—I beg to inform you, in reply to your letter of the 9th inst., that the Royal Commission are prepared to unpack and arrange the works you send for exhibition at Paris this year, at the same time expressly stipulating that they will not be responsible for loss or damage of any kind.

"Charges for transport (which must be prepaid), storage of empty cases, &c., will have to be borne by the exhibitor. The Royal Commissioners will provide screens at the rate of one shilling per superficial foot.—I am, Sir, yours, &c ,

"T. Cunliffe Owen, *Secretary*."

[We may here observe that Mr. W. Harrison, our Paris correspondent, has expressed his willingness to act as agent for any of our readers who intend to send pictures to the forthcoming Paris exhibition. We feel assured that this announcement will be received with great pleasure.—Eds.]

EXPOSURES.

To the Editors.

Gentlemen,—It would be discourteous on my part if I did not explain my seemingly abstruse meaning to your friend and contributor, the "Peripatetic Photographer." I gather, however, from his questions that he is an old hand and in no need of the information himself, but rather wishful to "draw me out" for the general benefit of the amateur readers of the Journal.

And first let me wish his wonderful old lady many happy returns of her birthday, and to express a hope that she may long live to bear any amount of exposure to "friz" water and snow; but, in spite of what is stated, I still maintain that to live constantly surrounded by white objects would be very miserable. Snow, even in Switzerland, gets of a dirty white, and so pleasing to the eye, as is attested by some relatives of my own who reside there. Constant white (especially from snow) produces paralysis of the eye and blindness, which condition of happiness (?) may possibly be the one alluded to by your correspondent. The sense of sight being removed to the others, mental activity and ripe old age are in the ascendant. The late Dr. Brewster was my neighbour at Gattonside, near Melrose, Scotland, in a house surrounded by dark spruce firs planted by himself, as he disliked a strong glare of light.

But, photographically speaking, what is exposure? This question is already in one sense answered by the questioner, but it bears a second meaning, and I regret the dulness of your "Peripatetic" friend in not seeing it. The mere capping and uncapping of the lens was plain enough to anyone, for without so doing you could not get any picture at all; but unless "exposure" be rightly understood the whole composition and trouble you have been at in preparing your plate may be spoilt for want of knowledge. Exposure consists in being able to rightly judge from the objects before you forming your subject what time is to be allowed for the rays of light to act on the sensitive film. This may be a moment of time, a minute, or even an hour; and therefore is an "indefinite something which can only be judged at the time of taking the picture."

In my communication I plainly laid down certain points to be observed as to the colour of objects and locality, and as they have been acted on by myself during an experience of more than twenty-one years with constant and unbounded success, it was in the hope of being an aid and help to others I wrote as I did.

If your contributor will personally write to me, it will give me great pleasure to explain any points in which he may not have understood me.—I am, yours, &c., W. Harding Warner.

March 5, 1878.

IMPROVEMENTS IN CARBON PRINTING.

To the Editors.

Gentlemen,—The mouthpiece of the Autotype Company, the editor of (the later editions of) their *Manual*, notwithstanding many excellent qualities, is highly sensitive, very easily offended, and not easily appeased. He has already given three different explanations of the cause of his offence in respect of my article on the above subject in your Almanac (see his first and last letters), and I verily believe that none of the three contains a statement of the real cause of his anger, which, put into plain language, is that, although not professing to write a history of carbon printing, but merely that of my own labours to supply an acknowledged want, I made no reference to his own claim to have done the same.

Well, having failed to conciliate the editor (of the later editions) of the Autotype *Manual* by my expressions of regret for having caused him annoyance by my withdrawal of the erroneous quotation—not by my reticence—let me more frankly state that I avoided the discussion of those claims, because had I alluded to the subject I must necessarily have raised doubts as to whether he has succeeded in rendering the manufacture of those colours so regular and definite as to entitle it to be called a practical process.

My doubt is founded upon the facts—1. That I have always failed, as has my *employé*—a very competent person—to obtain satisfactory results with the supposed new process communicated to me. 2. Because I have been assured by eminent persons that the manufacture of the photographic tints of pigment paper was never so irregular and unsatisfactory as at that time (a few weeks ago).

Some of your readers may naturally ask how it was that the discovery of a process so important as that which, it was supposed, would render the special pigment prints demanded by photographers permanent instead of fugitive should have been communicated to me—a person evidently, but erroneously, regarded as inimical to the Autotype Company, and capable of meanly attacking them by means of a garbled quotation?

Well, "thereby hangs a tale," which will not be found in the sixth nor in any subsequent edition of the Autotype *Manual*, but which may some day be written when the printing of the photographic tints in permanent pigments with brilliance equal to those of silver and gold has become an accomplished fact not resting upon the *ipse dixit* of myself or others, but based upon the proof of the regular production of the pigment papers, their uniform qualities, and the stability of the tints duly certified after sufficient experiment.—I am, yours, &c.,

London, March 6, 1878. J. R. JOHNSON.

"A TRIAL OF LANTERNS."

To the EDITORS.

GENTLEMEN,—In your valuable Journal of the 1st inst. appears a letter from Mr. Daniel, who therein relates a story of what he is pleased to call "a most careful and crucial test" of the respective merits of rival magic lanterns. I gather from the first and second paragraphs that a little bit of a muddle was made on some previous occasion, and the tests of the learned society of which he is Secretary are not all "careful and crucial."

Well, there having been a muddle in their first struggles after light, no doubt these western *savants* determined to be right next time, and lo! as the result Messrs. Newton and Co. were invited to send and did send a lantern burning three wicks, against which one of my triplexicons, without my knowledge, was fitted. Doubtless, the fall of the triplexicon was great, and "the opinions," "the unanimous ones," as we are told *(in the choice sentences with which the record of this precious trial concludes)*, of all the exhibitors were adverse to my lantern!

May I be pardoned if I suggest that it was scarcely fair to my invention that I, its father, was not informed of these proceedings, nor was I invited to be present to take care of my child and see that no tricks were played upon him. Of course I do not assert that to have been done, but all who know anything about magic-lantern lamps knows how much depends upon the careful trimming of the wicks, the proper adjustment of the lenses and lamp itself in the lantern, &c., &c.

However, gentlemen, I am quite content to allow the question of the superiority of my lantern to rest upon the verdict you recorded concerning it—a verdict made after repeated comparative trials—in which you say, only a few weeks ago, that my triplexicon gave the most intense light of all the lanterns you had tried.

I do not think it necessary to trespass further upon your valuable space. The fame of my lantern is already well established; and I conclude with a challenge to Messrs. Newton and Co., or any other manufacturer of lanterns, that I am prepared to submit and exhibit my lantern, personally, at the Inventor's Institute, 4, St. Martin's-place, Trafalgar-square, on Thursday, the 28th inst., at eight o'clock p.m., against any mineral oil lantern they may bring, not an imitation of mine or an infringement of my patent. The members of the said Institute and others will testify to the relative merits of the lanterns exhibited.—I am, yours, &c., W. C. HUGHES.

151, *Hoxton-street, N., London, March* 5, 1878.

[We have no intention of entering into the discussion which has been raised by the experiments recorded by some of the members of the Bristol and West of England Amateur Photographic Association, which, we may say, do not quite accord with some that we have ourselves made; but we may here observe that we do not attach much importance to comparative trials of the intensity of the light in lanterns unless the other optical conditions are identical in all cases, such as the diameter, form, and focus of the condensers and objective. Uunless these be absolutely alike in every respect, and the intensity of the illumination of the disc be tested photometrically, trials of lanterns made under other conditions cannot be held to establish the comparative merits of lamps of diversified forms of construction. Here let the discussion of the subject terminate.—EDS]

OBJECT GLASSES.

To the EDITORS.

GENTLEMEN,—While agreeing with Mr. R. W. Thomas in his statement respecting the non-deterioration of the qualities of the object glass of an astronomical telescope by the discolouration of the flint glass, I am dubious about the same holding good as to a photographic lens. Will the fact of the discolouration of glass not interfere with the transmission of the actinic rays?

It has always been considered that the employment of *any* good portrait lens in solar camera work rendered its action somewhat slower.—I am, yours, &c., ASTRONOMICUS.

March 6, 1878.

KEEVIL'S LANTERN.

To the EDITORS.

GENTLEMEN,—Will you permit me to testify to the extreme convenience and utility of Keevil's duplex lantern? I have given three public exhibitions with it—the last to 600 people—and it has answered admirably, throwing a picture of close upon twelve feet of perfect brilliancy with the safety jet; and, what is of equal importance, there is no perceptible difference between the illumination of either disc. The "visions" in *Gabriel Grub* were rendered quite as distinctly and brilliantly as with two separate lanterns.

I can most strongly recommend the lantern to intending purchasers of such an apparatus, as being not only economical at first cost but (unlike many economical things) absolutely efficient.

I do *not* advise amateurs, however, to attempt to make the oxygen during the lecture, as the bubbling noise produced every ten minutes or so is very confusing, besides the probable inconvenience of burnt fingers. I have thankfully gone back to the old familiar *bag*.—I am, yours, &c., C. H. FYNES-CLINTON.

Blandford Vicarage, March 4, 1878.

VOIGTLANDER'S NEW LENS.

To the EDITORS.

GENTLEMEN,—In reference to Mr. R. W. Thomas's letter in your last issue, respecting Voigtlander's so-called *new* lens, we, as the appointed agents in the United Kingdom for Messrs. C. A. Steinheil Söhne, cannot now refrain from making some few remarks thereon.

We understand from Herr Voigtlander's specification, given in THE BRITISH JOURNAL OF PHOTOGRAPHY, dated the 1st ult., that that gentleman claims as part of his patent the use of two symmetrical menisci lenses composed of flint glass of different densities. Now the following will clearly show that Messrs. Steinheil claimed the same for their well-known aplanatic symmetrical doublet lens more than *eleven* years ago, their first patent having been obtained on the 12th November, 1866. A detailed description of their lens will be found in THE BRITISH JOURNAL OF PHOTOGRAPHY for October 18th, 1867, by Dr. D. van Monckhoven; and another description, with a diagram, also appeared in the same Journal on November 15th of that year; while again a full description, with a diagram, was given in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1870, by the Editor, in a very able article upon *Photographic Lenses*, in which he says:—

"This objective consists of two symmetrical achromatic menisci, each of which is composed of *two flint glass lenses* of different thicknesses. It possesses diaphragms which are inserted between the two lenses, and extend the crispness of the definition over a large area. With its whole opening the objective works very quickly, and can be used for portraits in the open air, groups, the reproduction of animated objects," &c.

We will further refer your readers to a detailed description in a letter from Messrs. Steinheil, contained in your Journal of January 8th, 1875, in which they give the forms of the lenses, the densities of the glass employed, and other information.

We think, therefore, the foregoing will be quite conclusive in showing that Herr Voigtlander's *new* lens is identical with the one invented and patented by Messrs. Steinheil over eleven years ago, and which has been regularly advertised, and supplied by us to our numerous friends, for the last nine years.

In conclusion: we believe that had Herr Voigtlander known the whole of the particulars which are on record—at least in this country—he would have hesitated ere taking a step which must cloud his well-earned reputation, by obtaining a patent and bringing forward to our English photographers, as a *novelty*, a lens which has for so many years been in extensive use.—We are, yours, &c., MURRAY AND HEATH.

69, *Jermyn-street, S.W., March* 5, 1878.

HOW MR. GLADSTONE WAS PHOTOGRAPHED AS THE WOODCUTTER.—An action was heard at the Bolton County Court on Wednesday, the 6th instant. Mr. James Chambers, law stationer, sued Mr. Wm. Currey, photographer, Bolton and Manchester, for the sum of £8 8s. for assisting in photographing Mr. W. E. Gladstone, M.P., in the act of tree-felling, and for other services. On the 4th of August last the members of the Bolton Liberal Association had a trip to Hawarden Castle. Plaintiff and defendant were amongst the excursionists, who in the course of the day had the opportunity of witnessing Mr. Gladstone and his son, Mr. W. H. Gladstone, M.P., in the act of tree-felling in the park. On their way back to the station plaintiff suggested to defendant that with a little influence Mr. Gladstone might be induced to stand for his photograph in the character of "the woodcutter" at the foot of the tree he had commenced to hew down. Plaintiff and defendant accordingly returned to the park, and after a little persuasion obtained permission to photograph the tree only on the Monday following. Whilst making the journey to Bolton, plaintiff suggested to defendant that a letter should be written to Mrs. Gladstone soliciting her to use her influence with the right hon. gentleman and endeavour to induce him to sit for his photograph. This letter was despatched, and on the Monday plaintiff and defendant went to Hawarden Castle. On the way defendant said if he were successful in photographing the right hon. gentleman, and it turned out to be a profitable speculation, he would reward him (the plaintiff) handsomely. Mr. Gladstone consented to be photographed along with his son, in his dress as a woodcutter, with axe in hand, and defendant secured about half-a-dozen negatives. Subsequently he photographed the servants at the castle and the inmates of Mrs. Gladstone's Orphan Home, plaintiff assisting in the operation. The London Stereoscopic Company offered defendant £1,000 for the negatives without any further claim upon them, but this he declined. Eventually the plaintiff concluded an arrangement with another firm for the sale of a half share for £500, reserving certain rights, &c. Defendant sent for plaintiff to London to witness the signature of the agreement, but before his arrival everything had been concluded. His Honour held that there had been no contract on the part of the defendant, though there might have been the promise of a present, and gave a verdict for the defendant, with costs.

EXCHANGE COLUMN.

I will exchange Woodward's patent solar camera for a 10 × 8 camera and lens, or anything useful in photography.—Address, E. Plowright, Week-street, Maidstone.

A *carte-de-visite* camera, repeating back, very little used, by Garland, will be given in exchange for a good Albert or neck chain.—Address, Photographer, 60, Pentonville-road.

A new cabinet lens, with stops, and a new mahogany 5 × 4 camera, is offered in exchange for a watch and gold Albert.—Address, Photographer, 133, Heeton-road, Bermondsey, London.

ANSWERS TO CORRESPONDENTS.

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

P. S.—Thanks; but not at present.

Obliged Reader.—A swing-back is infinitely preferable to a swing-front.

Not a Yokel.—Try the effect of adding nitrate of uranium to the printing bath. Ten grains will be sufficient for a first trial.

Thomas J. Smith.—By reducing the strength of the albumen a finer result will be obtained. To each ounce of albumen add two drachms of water.

Trim.—The harshness of the shadows may be entirely overcome by the use of white screens to act as reflectors. The picture marked No. 3 is the best, that of the little girl being the worst.

Genduon Morgan.—Immerse the plates first in a hot alkaline solution (potash or soda), and after removing the film by friction with a hard brush treat the surface with nitric acid.

T. E.—We recommend you to keep a few lumps of charcoal in the water cask, and to protect the inner end of the exit pipe by a filter formed of *coarse* sand and roughly-powdered charcoal enclosed within two thicknesses of felt.

D. G. & Co.—The varnish films may be entirely removed from your old negatives by immersing them for a few seconds in a boiling solution of common washing soda. Transfer them afterwards to a vessel containing plain warm water.

P. Senoj.—A process similar to that which you describe was patented several years ago in this country and on the continent, by M. Tessie du Mothay. The knowledge of this fact need not interfere with your experiments, which, if assiduously conducted, may lead to your discovering much more than you at present anticipate.

"Chromotypes."—We are pleased to learn that Mr. Witcomb, of Salisbury—of the excellence of whose "chromotypes" we have formerly spoken—has opened an establishment for the printing of these pictures for the special class of licensees of the Autotype Company who have the right to issue chromotypes. He has our best wishes for his success.

C. B. M. P.—No indication of the ridges in the negative will appear on the printing paper. We strongly advise you neither to remove the varnish or apply a second coating until you have first submitted the negative to a careful printer. Seeing that it possesses so great a value, you should obtain from it a large transparency which could be utilised in the production of other negatives.

P. Vinaga del Valle (Havana).—This correspondent inquires—"How can I prevent the blistering of double albumenised paper? I have used all the solutions and water of the same temperature. I have also diluted the fixing solution to half-an-ounce for twelve ounces of water. An American paper recommends the use of alum, but another says that alum endangers the stability of the prints."——Can any reader supply the information? We have never had blistering of this kind.

F.R.S.—From experiments made during the summer with dry plates and the pantascopic camera we are quite convinced that this instrument may be most effectively employed with plates of this kind. Of course, to secure "instantaneous" effects the plates must possess at least the sensitiveness of wet collodion; but this is now a matter that presents no difficulty whatever.

A. B. C.—The rapidity of the lens may be ascertained either by comparing it, in action, with one of whose rapidity you are already assured or by ascertaining the relation borne by its aperture to its focus. From the description you give of the lens we think it probable that the front lens, if employed alone as a landscape lens, will cover a plate of 24 × 20 inches. Let the stop be about four inches from the flat surface of the lens.

Constant Reader.—There are two kinds of opal glass, namely, *flashed* opal and *pot metal*. In the latter the opaline substance of the glass extends from back to front of the plate; in the former it is confined to a thin layer on the surface. A picture taken on pot metal has a dull, sunk-in appearance as compared with the brilliance of one on flashed opal. If the wet collodion process is to be employed see that the collodion is rather old, and abstain from carrying the developing too far, otherwise the picture will be heavy and sombre. A very rapid exposure will be necessary in order to keep the shadows clean.

Sportsman.—You have no right to produce for your own use, or exhibit in your show-room, the portrait of any sitter without obtaining permission. Photographers do not usually ask for such permission; but after an objection to such a course has been intimated it is necessary to withdraw it from public exhibition. The negative is your own property, but you must not make use of it in the production of a print unless authorised to do so by the individual for whom it was taken. In other words, the glass and collodion film belong to you, but the *portrait* does not. You may either destroy the negative, retain it, or sell it to the parties concerned. You must be guided by circumstances as to which course you had better adopt.

J. J. H. writes as follows:—"I am trying to print from collographic plates, and though I think I succeed in the preparation of the plates the rolling up knocks me down! If your diversified genius could bring anything to bear on the subject by telling me where I am wrong I should be thankful. I have got proper lithographic ink and leather-covered roller, and I have tried various liquids to damp the plates, as also various exposures; still the ink will attach itself where it should not, and when I use thicker ink it tears off the film."——The remedy we propose is of a very practical nature. Let our correspondent obtain a lesson in the art of lithographic printing (for collography and lithography have much in common) from some one skilled in that method of graphic reproduction. To accede to the wish of "J. J. H." and tell him where he is *wrong* will involve him coming to London, bringing his printing plant with him, and going through the whole operation in our presence.

Photographic Society of Great Britain.—At the next meeting of this Society, to be held on Tuesday next, the 12th instant, at 15a, Pall Mall East, a paper, by Dr. D. van Monckhoven, will be read, entitled *The Fading of Carbon Prints, and Carbon Printing Without the Use of Bichromates.*

"The Graphic Portrait."—Under this designation Mr. A. Ford Smith has introduced portraits surrounded by floral and other artistic devices. The effect is striking, and will suit the tastes of that portion of the community who think that vignette portraits are improved by artistic surroundings. Judging from several specimens we have received, Mr. Smith displays excellent taste in the artistic composition and arrangement of the *materiel* (ferns, flowers, &c.) of which these surroundings are composed. We need scarcely say that the effect is produced by double printing.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.
For the Week ending March 6, 1878.
These Observations are Taken at 8.30 a.m.

Feb.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
28	29·94	W	49	51	55	45	Dull
March.							
1	29·77	W	52	53	57	50	Raining
2	29·87	NW	50	53	55	51	Cloudy
4	30·59	W	45	49	57	43	Cloudy
5	30·54	NW	41	45	56	44	Cloudy
6	30·12	W	49	52	55	44	Dull

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 932. Vol. XXV.—MARCH 15, 1878.

ON THE CONSTRUCTION OF ACTINOMETER SCALES.

In the construction of an instrument for taking actinometrical measurements by means of a graduated scale, the chief difficulty consists in obtaining a satisfactory range of tints or "steps" possessing at the same time the requisite delicacy and freedom from error in reading off the result. In order to secure this end it is necessary that the material of which the "scale" is made should be as even and homogeneous in texture as possible, as the slightest inequality or "grain" in the tints impressed upon the sensitive paper will be found to militate greatly against the correct reading of very delicate shades.

For use in carbon printing and comparatively rough work—that is, where two or three minutes, more or less, are of little consequence—the ordinary scale, composed of different thicknesses of thin, even paper, answers well enough; but when we come to apply such an instrument to more delicate purposes—as, for instance, testing the comparative rapidity of a dry plate—it is found to be quite inadequate to the end. Not only are the gradations too abrupt and the whole scale too dense, but the slight texture produced by the paper screen renders it extremely difficult to judge of the comparative action in two separate experiments. On this account we have for some time been endeavouring to find a better material for the graduated scale, for use not only in the manner just mentioned but also in outdoor work; for both of which purposes a more delicate instrument is required than the ordinary paper scale—that is to say, one which is more easily impressed over a comparatively large range of tints by a short exposure.

In this respect we have succeeded tolerably with thin paper rendered transparent by waxing; but, unfortunately, the permanency and uniformity of action of such a scale is not to be depended upon. One which we constructed some few months ago has become decidedly yellow, while the granularity of the lighter tints impressed is much more marked than if the paper were unwaxed. Long before this had occurred, however, we had altogether discarded paper for gelatine, and this, in one form or another, will, we think, be found the best material that can be employed, as when the screen is once made it is not liable to change, nor, if ordinary precautions be adopted, to injury from use and exposure to the atmosphere. Under the head of gelatine we include not only the method of superimposing various thicknesses of suitably-prepared gelatine tissue in the same manner as the paper scales are constructed, but also various modes in which the tints are formed by the action of light upon bichromated gelatine, either with or without pigment.

In our experiments with the first description we have employed gelatine tinted by chemical means, and by the addition of soluble colouring agents, in preference to using insoluble colours in suspension; this, we think, gives not only a more homogeneous film but permits the passage of the light through a large number of thicknesses of the coloured gelatine, and thus gives a greater range of tints. If the colour be composed of finely-divided particles of insoluble matter the film lacks transparency; and, though a single thickness may offer no greater resistance to the passage of the actinic rays than one in which a soluble colour is employed, it will be found that as the "steps" increase in number the opacity of the former, independently of their non-actinic colour, exercises a much greater retarding action than do the others, and the tints become more abrupt and less delicate. For some purposes, no doubt, this would be more suitable, but, as we have stated, our aim has been to obtain a scale capable of rendering the most minute gradations.

Potassic permanganate forms a convenient means of colouring the film, but it must be applied in very weak solution on account of the extremely non-actinic character of the colouration. It is a matter requiring considerable care to hit the right point, as even with a weak solution, if the gelatine be immersed for too long a time, the effect will be similar to that produced by a stronger solution; moreover, the permanganate can only be applied to the film after it has been poured upon glass, and not to the gelatine "in bulk," as it renders it insoluble. A second plan which gives a very fine tint, but requires some care, consists in treating the film, when well set, with ferrous sulphate followed by pyrogallic acid. The difficulty in this case is that there is no means of judging of the extent of the action of the iron until the pyro. is applied, when, perhaps, it is found to be overdone. The gelatine may probably be treated in bulk, and, when afterwards dissolved, diluted to the right tint by the addition of a plain solution.

The best of many colouring agents we have tried is saffron; its use is attended with no difficulties, and, as far as we can judge, the colour appears to be permanent. The saffron is digested in water till the colouring matter is extracted, and the liquor is then filtered and diluted with three times its bulk of water; gelatine is then added, allowed to swell and absorb as much of the colouring liquid as it will, and then dissolved by heat. Different samples of the saffron of commerce vary in the amount of colouring matter they give up to water; hence it is possible the dissolved gelatine may require "letting down" in colour, but the sample we have used works well when treated as above and poured upon glass so as to form a film of the thickness of thin note-paper when dry.

The films are prepared by pouring out the gelatine on to a sheet of plate glass previously waxed, collodionised, and washed. Immediately before pouring the gelatine the glass is dipped for a few seconds into hot water, rapidly drained, and placed upon a levelling-stand, where it is allowed to remain till the gelatine has set sufficiently to bear removal; it is then reared up to dry in some corner free from dust. When quite dry the compound film is readily stripped from the glass, and may be cut up and arranged in the form of a scale in the same manner as paper.

The chief objections to this form of scale are the inconvenience arising from the number of separate pieces of which it is composed, and the difficulty, if not impossibilty, of securing in one instrument a considerable range of tints of sufficient delicacy. This is, perhaps, not a matter which very closely affects its application to mere actinometric measurements of light, though it does to a certain extent; but, in testing the sensitiveness and other qualities of dry plates, it is of paramount importance that the tints should be as finely graduated as possible. Now, in the scale instrument, constructed on the above principle, the range of tints available is very limited. If the pellicle of which the screen is formed be sufficiently transparent to permit the impression in a reasonable time of (say) a dozen tints or degrees, by the time that the fifth or sixth, or perhaps seventh, is impressed numbers one and two are indistinguishable, having acquired the same strength of colour. If the pellicle be made denser, then the number of degrees it is possible to impress by *any* exposure is curtailed, so that in either case the range is limited.

In measuring the power of the light we have nothing to do with any but the highest degree impressed; that represents the actual extent of actinism expended, the intermediate steps having lost all value. But if we are testing the properties of a dry plate, its power of rendering delicate gradations, or, better, the capabilities of some particular form of developer in giving density without obscuring the half-tones, each individual tint of the scale, from absolute transparency to perfect opacity, has its own value and must be clear and distinct from every other; but to attempt to vie with nature in the immense variety and delicacy of the gradations of light and shade which it presents to the camera is more than we could hope to do by any artificial means, however perfect.

With a view of removing, or at least abating, these objections to the use of the graduated scale we sought the aid of bichromated gelatine, the successive tints being formed by means of progressively-increasing exposures to light. We first tried the ordinary pigmented tissue, but were soon compelled to relinquish that, as the "texture" conferred upon the gelatine image by the paper support destroys the finer gradations, and the quantity of colouring matter present limits the range of the scale too considerably. We next tried films of specially-coloured gelatine extended upon collodionised glass, and when dry stripped off in the form of a tissue, as in Swan's original process. In this manner we entirely escaped all traces of texture arising from the physical nature of the support and obtained altogether better results; but the preparation of the pigmented gelatine in a sufficiently homogeneous condition is a troublesome operation, and one which amateurs as a rule will not care to undertake.

As the best method we finally fixed upon colourless gelatine, or so slightly tinted as to render the development of the image more easily distinguishable, as in the entire absence of colour it is impossible to judge of the action of the developing water. The graduated film of gelatine thus obtained may be easily and satisfactorily coloured by the subsequent application of a variety of solutions. The great advantage of this plan is that the absence of opaque colouring matter permits the light to act through a greater thickness of the gelatine, and at the same time considerably shortens the exposure necessary, enabling us to secure a very wide range of tints.

An unusual press of matter compels us to leave over until next week the description of our *modus operandi*. We shall also have some remarks to make upon the graduation of scales by mechanical means.

THE PHOTOGRAPHIC USES OF BITUMEN.

From what we can learn bitumen, or asphaltum, was pressed into the service of photography in the year 1844, or nearly thirty-five years ago. M. Nicephore Niepce ("glorious old Nicephore," as the late Mr. C. J. Burnett delighted to designate him), the *confrère* of Daguerre, was the first to discover the extraordinary photographic properties of bitumen of Judea, or "Jews' pitch," as it is sometimes termed. The discovery of M. Niepce consisted in the following:—

Asphaltum, when dissolved in essential oil of lavender and poured upon a tablet of plated silver or other polished metal, forms a varnish sensitive to light, the action of which renders the layer of bitumen insoluble in proportion to the duration of the luminous action. If an image be impressed upon a sensitive surface of this description, and the tablet be afterwards treated with a solvent of the resin by which it was sensitised, it will follow that those portions corresponding with the action of the light will remain unchanged, while the shadows will be dissolved out. Various surfaces prepared in accordance with this principle were made use of by M. Niepce, some, as we have indicated, being metal, while others were of glass or stone. This earliest of experimentalists having obtained pictures upon metal plates, subjected these plates to the solvent action of nitric and other etching fluids. This, in the estimation of most writers, was the first practical photographic process that was published. Be this as it may, it is a process which, after having been improved and modified by subsequent experimentalists, has proved of great utility and is likely to receive further development.

Those members of the Society of Arts who, with their friends, listened to the explanation given on Monday evening, the 4th instant, by Mr. Thomas Bolas, with regard to the photographic uses of that most unphotographic-looking substance, asphaltum, must indeed have felt that the force of manipulative facility could no further go. To show the photographic sensitiveness of one of the most common of substances Mr. Bolas, among other experiments, developed in the presence of his audience a picture formed of the common Brunswick black of the oil shops. Nor was the resulting picture one that required any apology, for, when exhibited to the audience by means of the lime light, it was found to possess all the delicacy characteristic of the best bitumen pictures.

Asphaltum is well known to be specially adapted as an etching ground when engravings are to be produced, owing to its capability of resisting acids and other etching fluids. This led to its employment for this purpose, in connection with photography, by M. Niepce de St. Victor, who devoted much time to ascertaining its capabilities. Of Gallic origin it has received its chief development through Frenchmen. In the hands of several experimentalists and professional men in Paris, the production of photographic engravings by the agency of bitumen has been carried to an extent and has attained a degree of refinement altogether undreamt of a few years since.

The chief differences existing in the methods of carrying out bitumen engraving processes are to be found in the solvents for the resin both before and after the exposure. Oil of lavender, as we have already stated, was the solvent employed by the elder Niepce. Those who followed in his footsteps employed other solvents. Ether was at one time strongly recommended as the best solvent for bitumen, especially when it was applied in photolithography, and we have seen several excellent prints of this kind produced by the late Mr. Macpherson, of Rome, who advocated the employment of this solvent. Oil of turpentine is a favourite solvent with many. Some refinements upon its use are adopted, such as keeping it in an open bottle for a month previous to dissolving in it the bitumen, the proportions of these being as one to fifteen in the hands of at least one skilful operator.

We are aware of one highly-successful photo-engraver who adopts as a solvent for the bitumen a mixture of chloroform and benzole, in the proportion of two parts of the latter to one of the former; but for all practical purposes benzole, without any addition whatever, will answer most effectually all the functions desired in a solvent of the sensitive resin. This, too, was evidently the opinion entertained by Mr. Bolas, inasmuch as it was the solvent adopted by him in the preparation of his plates on the occasion to which we have referred.

The applying of a uniform coating of this resin to a plate of metal or glass has sometimes been attended with difficulty. By the method exhibited in action by Mr. Bolas this was effected in a perfect manner in somewhat over a minute of time. Upon a circular table of small dimensions, capable of being rotated very rapidly in a horizontal direction, was placed the copper plate to be coated. A little of the sensitive solution, of about the consistence of collodion, was poured upon its centre, and the services of a close cover were utilised in order to prevent the sparks caused by the rapid rotation of the table, which followed the closing down of the cover, from damaging the dresses of those in its vicinity. After a few revolutions of a handle connected with multiplying gear the plate was removed, and, when handed to the audience for examination, it was found to be coated in a very uniform manner, the surface being also quite dry.

However diversified may be the idea of experimentalists respecting the best solvent of the asphaltum previous to exposure, not less are the differences of opinion as to the best solvent after exposure. Benzole is used by some, but the complaint preferred against it is its too energetic action. To curb this one Parisian engraver, who has the reputation of having produced some of the finest line engravings from photographs, prefers to almost saturate the benzole with asphaltum previous to employing it as a developing agent. Oil of turpentine is preferred by many; but as the solvent action of this substance, when employed alone, is very slow a developer having a manageable degree of rapidity is found in a mixture of these two liquids.

As a basis for success in operations which depend upon bitumen it is of paramount importance that the proper kind be obtained.

RIPENING OF COLLODION.

The subject indicated by the title of our article is one which forces itself upon the notice of every photographer—from the busy professional portraitist who uses up a pint or two a day to the amateur whom a pint would last a whole year or more so far as the actual coating of plates is concerned, but who, alas! for his pocket, finds that for every ounce he puts on his plates he pours five times as much away, owing to its having "lost its power," to use the expression he frequently employs.

It is with regard to the keeping properties of collodion that we are impelled to write now by the results of a few experiments we have had in progress for some time. They have quite led us to the conclusion that the popular ideas relative to the ageing of collodion are open to considerable correction.

The veterans of our art will well remember the time when it was the fashion for most of them to make their own collodion, and when the number of makers of a really good commercial article were very limited. This was before the time that Mr. Hardwich and others published their researches on the manufacture and properties of pyroxyline, and when the photographer was a happy man if he managed to make most of his gun-cotton dissolve, and, above all, if he managed also to dissolve the bulk of his iodide and bromide; for in those days it had yet to be learnt that it was in the pyroxyline rather than in the sensitising salts that the cause of differences in the working properties and the sensitiveness of the collodion were to be sought.

The knowledge of the chemical principles involved in the manufacture of collodion being thus limited, such popular terms as the "ripening" and "maturing" of collodion were naturally invented, and have remained in use up to the present time, and are still, to a limited extent, serviceable as representing a fact without involving any theory. But the compositions of collodion now varying among themselves, as they do, have a distinctive character they did not possess in the early days of photography. Then, iodised collodion only was employed, and iodide of potassium almost was the only salt made use of for iodising.

The action of iodide of potassium on the collodion is to make it flow more freely, and gradually to lose its setting powers—a property valuable if glass positives are taken, where complete purity of shadows is essential to perfection of results; but fatal for negative work where rapidity is wanted—such rapidity as we now consider a necessity. The further action of the alkaline iodides upon the collodion is to make it give an intense image—a point, again, of importance under the old *régime*, when negatives in their high lights used to be as opaque as if they were cut out of sheet metal. The collodion then was considered ripe, and after a while to be perfect if a little slow. Its colour was considered a complete guide to its properties, and unless it was almost like port wine it was used with doubtful confidence.

Then came the more general use of cadmium and different metallic iodides; and ammonium, with the other alkaline and alkaline earth iodides, and then the bromides, all sorts of changes being rung upon them. Potassium gradually got "edged out," and at the present day cadmium and ammonium are the sheet anchors of collodion makers. During all these changes the old dislike to a colourless collodion remained, and became perhaps intensified by the use of cadmium iodide, which, when not combined with other iodides, has the property of causing the collodion to become ropy and gradually solid—a state which cannot be remedied by the addition of fresh solvents. A further objection to the colourless collodions is the greater skill needed to use them successfully to avoid fog and flat negatives.

Were we now to poll the whole fraternity of photographic operators, we believe that by a good majority the following would be their judgment upon them:—"Any colourless collodion not fit for regular work; red collodion works well, but slow; deep-sherry colour best; finally, no collodion is any use till mixed a few days."

We now wish to point out that the results of our experiments show that with a suitable collodion the best and cleanest results can be obtained with an absolutely colourless collodion. We have used one made entirely with cadmium salts and a *suitable pyroxyline*, which would hold its own against the best collodion to be had anywhere. We have used it two months' old and two years' old, the older being as quick as the newer, but working cleaner and freer from spots. We cannot but think that if collodion makers would send out ready iodised such a collodion it would meet with a favourable reception. For those whose use for it is only occasional it would be a boon; while to others who use it daily it would be a collodion of constant character, its sensitiveness not changing from week to week. If any difficulty were found in working it, a small quantity of iodine added would make it amenable to the treatment of the most unskilled.

With regard to the question of newly-mixed collodion, we can only say that it is our habit to keep a store of plain collodion by us sufficient to last a considerable time; and when we wish to obtain the highest possible amount of perfection we do not hesitate to mix it with the iodiser *immediately* before use, fully confident that neither cleanliness nor evenness of result will be in the slightest degree inferior to that obtained by using the mixture when a week old. This we find not with one kind only, but with all kinds and with all makers' collodions.

Making, as we do, numerous experiments as to sensitiveness of various plates, we have found that the colour is not at all to be relied upon as to the rapidity of working a collodion will possess. It is usually considered that so long as a collodion is pale its sensitiveness is at its highest pitch. This we do not find to be invariably the case. A newly-mixed collodion (the plain collodion well kept) will usually after an hour or two become considerably darker in colour, and after a few days lighter again, owing to the absorption of the liberated iodine by the ether, which appears to possess the property of combining to form a colourless compound with iodine, especially in presence of bromide, and more particularly with methylated solvents.

It would appear that this evolution of iodine at first is too sudden to allow of the colourless compound to be formed, but that afterwards as fast as the iodides are decomposed by the change which ensues on keeping the collodion the evolved iodine is re-absorbed till a certain stage is reached, after which it is given off too quickly to be taken up. This, however, with an average good collodion does not occur till after the lapse of some months, the collodion meanwhile being pale and working well. Now we have little hesitation in affirming that, contrary to the usually-received opinion, this slightly-coloured collodion is not necessarily a quick collodion, nor does its character remain the same though the colour be unchanged. The result of a considerable amount of experience and of some special experiments is that week by week the sensitiveness is diminished; along with this diminution a more intense character is given to the negatives.

The final results we would point out are that a colourless cadmium iodide, and bromide collodion will work well and quick; that a newly-mixed collodion containing alkaline salts as well as cadmium is perfectly fit and excellent for immediate use; and that the mere colour of a collodion is no test of its sensitiveness or its working qualities. We are aware these conclusions are contrary to usually-received notions, but we have not adopted them carelessly nor without mature consideration.

A FIFTY-POUND PRIZE DRY PROCESS.

It is with no small degree of pleasure that we are enabled to announce that the substantial prize of £50 has been offered by a private gentleman as an incentive to progress in dry processes. Mr. Joseph Paget, through whose liberality this prize is offered, considers that several of the requirements of a perfect dry process have not yet been secured—a chief defect, in his estimation, being the uncertainty in producing the best possible result when the development of a negative is deferred for a period of three or four months after exposure.

No one experienced in dry-plate photography is unaware of the fact that by the majority of dry processes plates will not keep well after exposure. We here use the term "keep" in its conventional sense, namely, that the longer after exposure the development of the latent image is delayed the more surely does such latent image return to—nothingness. Supposing that three plates, alike in every respect, have received the same amount of exposure today, and one of them be developed within a day or two, it will yield a good and vigorous negative compared with the second plate the development of which is delayed for a month; while the third plate, if developed six months after exposure, will not yield more than a feeble, shadowy image, if it produce an image at all, which is somewhat improbable. This is in a most marked degree the case with plates in which tannin has been employed as an organifier or preservative; and in working with that process it is necessary to counteract the rapid action of time as a destroyer of the latent image by giving a prolonged exposure to the plate, the degree of prolongation bearing a strict relation to the probable duration of the time intervening between exposure and development.

We have mentioned the tannin process as a well-marked instance of one which yields plates that do not keep after exposure. An image impressed upon a collodio-albumen plate will, on the contrary, remain in an excellent state of preservation for a long period before development. We have developed an image upon a plate of this kind twelve months after exposure, the particular form in which the process was employed being a modification of Dr. Ryley's hot-water process. It has long been believed that an albumen preservative, aided by a final wash of gallic acid, provided the only means by which plates possessing keeping qualities after exposure could be prepared; but recent experiments have indicated gelatine as not unlikely to rival albumen in this respect.

With regard to the keeping properties of plates *previous* to exposure we need say little. It has been abundantly demonstrated that several years after preparation dry plates, when prepared with care, will yield negatives of the highest quality. The most recent instance of this we have seen was the exposure and development within the present month of some of a batch of "Russell plates" that were prepared at the same time as, and under precisely similar circumstances to, those that were taken by Mr. H. M. Stanley as part of his outfit for his tour in connection with African exploration. With respect to that outfit we may observe that the plates exposed two or three years ago by him and developed at, or soon after, the time of exposure have yielded successful negatives, while those of which the development was deferred till his arrival in this country have scarcely shown even the trace of an image; nor is this more than what would have been anticipated by those conversant with dry plates having a tannin preservative.

It is a healthy sign when we find a gentleman like Mr. Paget adopting the means to which we have referred for promoting the progress of dry-plate photography, and his action in this respect contrasts favourably with that of those, whether they be societies or individuals, who offer prizes for *results* of processes—a course which cannot stimulate investigation or research. We may state that one condition under which the above prize is offered will be not merely the demonstrating to the satisfaction of the jurors who may be appointed that the process is the best, but also that such full details of its nature be given as to enable others to work it successfully in like manner. It would be desirable that the Photographic Society of Great Britain should supplement the well-timed generosity of Mr. Paget by offering its silver medal for the second best of the processes exhibited in competition, and in doing so take care to avoid incurring the stigma that attached itself to the council of the now extinct, although at one time influential, Photographic Society of Scotland, which offered a *bronze* medal for the best process and a *silver* medal for the best results of the bronze medal process. Hitherto very little encouragement has been given to inventors and discoverers when contrasted with that bestowed upon those who work by the light of such inventions and discoveries; let us indulge in the hope that the example so nobly set by Mr. Paget will be speedily followed by other gentlemen.

ON THE STRENGTH OF BICHROMATE SOLUTION USED IN PIGMENT PRINTING.

The memory will not be severely taxed in going back to a time when the journalism of photography was a means of showing how opposed ideas may be on so simple a subject as the best strength of the nitrate bath for silver printing purposes.

The means for at once determining this point seemed to be so simple that it would appear to the uninitiated a question so easily settled as to afford no scope for any prolonged discussion. Yet the opinion thus formed would be speedily altered could a glance at the variety in the quality of negatives produced in different studios be obtained. Clearly, to get the best result a dense negative would require different treatment to one of those thin, weak negatives barely removed from a positive. Seeing it has been found that no hard and fast rule can be laid down to determine the strength of the positive bath (except it be a strong bath for thin negatives and a weak one for dense ones, this again varying with temperature, time of floating, &c.), it seems reasonable to expect a like variety in the strength of the sensitising solution employed in the process of carbon printing.

Solutions of bichromate of potash varying from one to seven and a-half per cent. have at times been recommended, and no doubt that each in the circumstances gave the best result; hence it becomes of interest to ascertain the particular conditions that would lead one to select a strong sensitiser and another a comparatively weak one, and also the reason for so doing. The rule is a strong solution for dense negatives and a weak solution for thin negatives. But why? A little reflection will soon determine.

The gelatine of which tissue is made is mixed with a given quantity of pigment sufficient to reproduce the deepest blacks, as is evidenced by its appearing black on the white paper upon which the compound is spread; but, to be understood, it will be better to dispossess the gelatine of its pigment and then follow the action of light on the simply-bichromatised gelatine. If a sheet of such gelatine be looked at by transmitted light it will be seen to have properties in common with yellow glass, so far as regards opacity to the so-called actinic rays, and the greater the proportion of the bichromate the more non-actinic such gelatinous film becomes.

Now, if two such films—the one containing a small proportion of bichromate of potash comparatively to the other—be exposed to the action of light, each would permit a certain proportion of actinic rays to pass entirely through; but in one case more of the rays would be arrested and employed in producing that decomposition resulting in insolubility of the previously-soluble gelatine, and hence it would print quicker. There is also another difference to note, viz., more rays would be arrested at or near the surface in the case of a strongly-bichromatised film, and fewer allowed to proceed than in one containing less of the salt. Thus, of two sheets—one having more bichromate in than the other—it is evident there will be a difference, both in rapidity of becoming insoluble under the action of light and in the relation between surface insolubility, and the total insolubility produced by prolonged exposure; that is, with a large proportion of bichromate in the gelatine the surface exposed to the light would, *comparatively* with the rest of the film, sooner become insoluble than in one containing a smaller proportion of the chromium compound.

Let this action now be followed in the pigmented film, and the reason why a strong bath is selected to sensitise tissue to print dense negatives is obvious; for what is wanted to produce harmonious results is a comparatively rapid surface action to secure all the delicate but over-dense half-tones, and thus to compensate for want of harmony in the negative. With a weak negative the reverse is required. With a strong bath the half-tones would be over-printed before there had been time for the light through the deepest shades to bring about the decomposition necessary to secure the requisite vigour, which can only be ensured by a weak sensitiser and longer printing. The truth of all this will readily be seen when it is remembered that in pigment printing the action of light does not produce the pigment, but simply imprisons what is already there by making the gelatine insoluble.

I have known it attempted to secure this desired variety in sensibility of tissue by immersing it for a shorter or longer time in a given sensitising solution. This is a practice that cannot be too strongly condemned; for with a short immersion, if there be the least inequality in the thickness of the pigmented gelatine, there is certain to be a corresponding difference in the sensibility of the tissue, and hence stains. Of this more will be said at a future time.

A ready way to determine (when it is desired) the best strength of the bichromate bath to use is to prepare a series of baths varying in strength (say) from one to seven per cent. Sensitise a small piece of tissue in each bath, and then expose under an average negative; develope, compare results, and the knowledge gained will repay the trouble. W. E. Batho.

A RÉSUMÉ OF THE GELATINE PROCESS.

[A communication to the Edinburgh Photographic Society]

The Corresponding Secretary has been good enough to invite me to contribute a paper on gelatino-bromide as a subject for discussion at the meeting of the Edinburgh Photographic Society; and I willingly respond to the invitation by transmitting the following remarks, in the hope that a short *résumé* of the results of several years' work may not be without interest, and may stimulate those who are willing to do so to give this process a trial in the coming season.

Of progress and improvement in the character of the gelatine emulsion I have nothing of novelty to record. Long experience has convinced me of the reliability of my own gelatino-beer emulsion, and I continue perfectly satisfied with the formula I have published in The British Journal Photographic Almanac for 1877. The plates prepared with it are somewhat slow; but I am convinced that in this process, as in all others with which I am acquainted, rapidity can only be attained at the sacrifice of reliability. Moreover, it will be found, I think, that the slowest gelatine plate that can be made is still in advance, in point of rapidity, of every other reliable dry plate. The use of an organifier in this process has recently been condemned; but, after hundreds of experiments with emulsions concocted with every possible combination of ingredients, and with all the bromides to be obtained, I still maintain firmly that uniformity of action and adequate density in the negative are unattainable without it.

Of the various substances which may be used as organifiers of the gelatine emulsion, sugar and beer have proved the most efficient in my hands. The former, however, confers an objectionable stickiness of surface upon the film, and this evil is intensified whenever damp weather supervenes. In spite of recently-suggested improvements in the method of eliminating the nitrate salts from the emulsion, I still adhere to the old plan of washing, as involving, in my hands, less trouble and complication. In the hottest weather the gelatine will readily set in our latitudes if the dish into which it has been poured be placed for a minute or two upon a slab of stone or sheet of iron. Nothing can well be more simple, and certainly nothing can be more effective, than merely to place the dish of emulsion in a vessel of water over night and find it ready for use in the morning.

Messrs. Wratten and Wainwright's discovery will be invaluable for dealing with large quantities of emulsion, and also for use in the tropics; but, in my opinion, amateur workers in this country will do well to leave dialysis and the alcohol process alone, and trust solely and implicitly to a bath of cold water.

Many amateurs have been frightened away from the process by the multiplicity of the apparatus recommended in the preparation of gelatine emulsion and plates, and I fear that I myself am, to some extent, guilty in the matter. A drying cupboard with levelled shelves is a most useful adjunct to the laboratory; but I quite agree with Mr. Kennett that it is by no means an essential to success. An accurately-levelled surface upon which the newly-coated plates may be laid till the films have set is all that is really necessary, and the plates may be stored for drying on any convenient shelf or receptacle where fresh air can, and dust cannot, have access to them. In the operations connected with this process it is better to trust as little as possible to artificial heat; although, in the case of the dried film, the application of a high temperature will prove an infallible mode of preventing blisters.

I will repeat at this point directions for making the most reliable emulsion I know:—

Gelatine	40 grains.
Bromide of ammonium	20 ,,
Nitrate of silver	40 ,,
Spring water	1 ounce.
Table beer	1 ,,

Place the bromide and gelatine in seven drachms of the water, and the silver (in a separate vessel) in the remaining drachm. Give both solutions a warm bath till the gelatine has dissolved. Then, in the dark room, thoroughly mix and leave the emulsion in a warm bath for four hours at least. This is most conveniently done in an infant's food warmer, a very small flame being applied below. As soon as the bromide of silver has had time to form—*i.e.*, in four hours—pour out the emulsion to the depth of a quarter of an inch, and, when the gelatine has set, place the dish over night in a pail of cold water, and in the morning it will be ready for use. The ounce of beer is now added to the warm emulsion; the whole is well shaken and passed through a pledget of glass wool in the neck of a funnel, and then the plate may be coated with it. A fair latitude may be taken in the exposure of the negative; but it is necessary to remember that the mistake of over-exposure is more readily obviated than that of under-exposure. Some quarter-plate negatives which I have sent by post may be taken as samples. Particulars of light and exposure will be found upon each.

It will be unnecessary to give details of development. Suffice it to say that the best results are obtainable with a three-grain solution of pyro., to which a drop or two of a one-in-sixteen solution of strong ammonia has been added.

I now pass on to a further development of the gelatine process, by means of which the tourist may avoid the weight and danger of his glass plates. I have already supplied the details in a paper read before the Liverpool Amateur Photographic Association; but I have since perfected and simplified the process, and will, therefore, give the revised directions.

A sensitive gelatine film may be made and stripped from the glass as follows:—

Gelatine	30 grains.
Bromide	10 ,,
Silver	20 ,,
Water	4 drachms.

Proceed in accordance with the directions already given until the emulsion has received its five or six hours' immersion in a cold bath. Now take two drachms of fresh ox-gall and two drachms of table beer; warm, and add to the half-ounce of emulsion. Filter and coat the plates. It is necessary, however, to obtain a much thicker film than the ordinary process supplies, and therefore the plate, when thinly coated, should be laid on a level glass plate, and an additional supply of emulsion poured upon it—to the depth of about the eighth of an inch. It will be found that the gelatine will not flow over the edge of the plate unless too much has been added; and when the film is set it should be placed in a position where no dust can have access to it, and where as much air as possible may stream over its surface. When dry a knife-point is to be inserted round the edge, and the sheet will come away with the greatest ease. The underside will be found to give the best surface for exposures in the dark slide. It is possible that some may find this process too extravagant in the quantity of emulsion it will require to coat the plates satisfactorily—*e.g.*, three ounces are needed for one dozen quarter-plates. I prefer, therefore, to coat my plates with plain gelatine first, and then with the usual amount of emulsion. The following are the details of this process:—

Gelatine	30 grains.
Water	7 drachms.
Ox-gall	1 drachm.

Pour this on to clean plates, and add the liquid gelatine on the level surface to the depth of an eighth of an inch.

As soon as the film has thoroughly set it may be sensitised with emulsion, and when dry stripped from the glass. The emulsion for this purpose, however, must contain thirty grains of gelatine per ounce. In other words, the proportion of gelatine per ounce in the sensitive layer of the film must be the same as that contained in the preliminary coating. To use these sensitive sheets in the field I recommend that each dark slide be provided with its own sheet of glass to support the gelatine.

The sensitive sheet may be simply backed up by these glasses; but a still better plan will be the following:—Coat the glasses with a solution of forty grains of gelatine, twenty grains of sugar, a few drops of red aniline dye (to prevent blurring), and one ounce of water. When dry these sugared plates will have a slightly tacky surface, and the stickiness may be augmented to any extent by breathing upon the film. Take, then, the sensitive sheet, lay it face down upon a piece of smooth paper, and press the sugared glass firmly upon it. It may now be placed perfectly flat in the slide, and be readily removed when the day's work is done, to give place to another sensitive film by a repetition of the same process, and without disturbance to the sugared gelatine. Another method is to construct home-made slides of cardboard for these gelatines. I enclose a hastily-made specimen as a sample. The exposure required will be a trifle longer than that of the ordinary beer plate.

Development must be carried out as follows:—A dish, a few inches longer and broader than the film, is to be filled with water and the negative plunged in, and allowed to soak till expansion has ceased—*i.e.*, for about two minutes. Should there be any indication of uneven expansion, or of awkwardly prominent wrinkles, this may be remedied by the application of a large camel's-hair brush, which should always be at hand. When the alkaline pyro. has been applied a novel process of photographic enlargement will be witnessed, for the resulting negative will be considerably larger than the original picture.

Intensification, if needed, should be employed before fixing, so that detail in the shadows may be brought out. Washing must be very thorough, both before and after fixing, and care must be taken to hold the film with the camel's-hair brush whenever the solutions or washing water are poured off. As soon as all traces of hypo. have been eliminated, the dish must be again filled with water, a glass plate of sufficient size inserted under the film, and, the film being held on the glass with the brush, the water is allowed to drain off, leaving the negative on the glass plate. Any bubbles of air or water between the film and the glass may now be removed with the aid of the brush. The glass is then placed in the air till dry, and then the negative will come away in a firm and even sheet, from which any number of prints may be taken.

I have sent one or two negatives taken on these films; but since my discovery of this process I have been favoured with neither light nor opportunity to enable me to obtain satisfactory negatives. Those I have sent by way of illustrations of the process should be looked upon rather as indications of what may be done under more favourable circumstances than as specimens of the excellence of this process. The two marked films are curious from the fact that the preliminary layer is composed of common glue.

I must say a few words with reference to the ox-gall. It is better to obtain the gall bladder from the butcher, and to allow it to hang in a cool place for a day or two. During this time a slimy mucous will subside to the bottom of the bladder, and, with a little care, the pure, clear gall may be poured off by making an incision in the upper part of the duct. I find that it will keep sweet and fresh for a week at this time of year. Another application of gelatine which I desire to mention is for the purpose of focussing. The slide I have sent by post was made by me of gelatine and cardboard, the film being composed of a forty-grain solution of gelatine with one drachm each of skimmed milk and ox-gall. Detailed directions will be found in THE BRITISH JOURNAL OF PHOTOGRAPHY of the 8th instant.

At this point I bring my *résumé* to a close; and I do so, not because I have reached the end of my subject, but rather because I fear that I have exhausted the patience of the members.

H. J. PALMER, M.A.

THE ELIMINATION OF THE NITRATE SALTS FROM GELATINE EMULSION.

[A communication to the South London Photographic Society.]

IT was proposed by Mr. J. T. Taylor, at the close of the February meeting, that I should on this occasion demonstrate to the members my latest published method of washing gelatine emulsions. It was also announced in the journals of Friday last that I would demonstrate to the members the development of a washed emulsion plate. I have come prepared to do both. We will take the subject of gelatine emulsion washing first.

In order that I may make my proceedings both interesting and useful to the members and visitors present, I will first proceed to describe the method of compounding the emulsion, and give a useful working formula. To many here present I doubt if I have the ability to teach anything. What I have to say will be to them as an "oft-told tale," but I know their patience and rely upon it for their attention. I shall feel myself amply compensated if but the least experienced member here present shall gain one new idea. I can leave the rest to him, satisfied that it will not remain dormant.

In a gelatine emulsion the simplest form of emulsion is exemplified. Its components are almost invariably only bromide of silver and gelatine. It is true there is now and then a talk of adding thereto a chloride, an iodide, or a fluoride, but I doubt if many experiments include either of these ingredients; the bromide alone absorbs all, or nearly all, the attention. I cannot doubt, from what I have done already, the benefit to be derived from the addition of an iodide, especially for scenery in which foliage and trees predominate. The outlines appear to me to be more sharply cut against the sky; in point of fact, the picture seems to bear a closer resemblance to the wet plate. The only necessary ingredients of a gelatine emulsion are three—the gelatine, the bromide of any base—ammonium, potassium, cadmium, or any other, according to taste and fancy—and nitrate of silver.

Let us suppose we have to compound ten ounces of gelatine emulsion. We shall require (say) 200 grains of gelatine (I like Nelson's No. 1 quality), ninety grains of bromide of ammonium, 150 grains of nitrate of silver, and nine ounces of water. During the operation of washing the gelatine will take up the remaining ounce of water. We will select a bottle which has a good stopper—one that fits closely and well. We will place therein the gelatine, the ammonium bromide, and six ounces of distilled water; shake well until the gelatine is well covered by the water, and then stand it aside to soak for half an hour. Now we take a similar bottle and place therein the nitrate of silver and the remaining three ounces of water to make up nine ounces. When the gelatine has been well soaked we stand the two bottles in warm water (say) of a temperature of 100° Fahr., and solution will soon come about. Then we unite the contents of the two—not slowly and with frequent shakings between, but empty the one bodily into the other, and shake well for some minutes. This plan of adding the whole bulk at once would not do if the solutions were not *aqueous*, as in collodion; but there is no drawback to it whatever in gelatine emulsion work, for both the bromide of ammonium and the nitrate of silver being perfectly soluble in water incipient decomposition cannot take place. In other words, there can neither be "locked-up" silver nor "locked-up" bromide, as might be the case if the solutions were overcharged, as in adding nitrate of silver in alcohol to bromised collodion. We have now a crude emulsion containing both free bromide of ammonium and nitrate of silver; for the resistance presented by the viscidity of the gelatine operates effectually to prevent instant decomposition of the whole of either.

Now, what is double decomposition? Simply interchange of elements—exchange of bases. In this case the nitrate of silver and the bromide of ammonium exchange bases, forming bromide of silver and nitrate of ammonium; whereas, before this is brought about, we had bromide of ammonium and nitrate of silver. A very simple experiment will illustrate this to the uninitiated. Here I have two bottles; the one contains nitrate of silver in water, the other bromide of ammonium, also in water. I unite the two, and instantly you see the result; there being no preventing medium, insoluble bromide of silver subsides, and nitrate of ammonium, being soluble in water, remains in solution. In this case it is easy to separate the two by simple decantation and rinsing with fresh water.

It is perfectly natural for one at first sight of this experiment to say—"Well, if this be so easy why not make your bromide of silver in this way, and add it after washing to the gelatine solution?" Exactly; but for the most cogent of reasons this will not do. Bromide of silver thus formed is only sensitive to light in a very minor degree—a degree totally useless for photography. It is necessary that it should be formed in combination with organic matter; and in gelatine we have organic matter capable of imparting to bromide of silver the highest degree of sensitiveness with which we are yet acquainted. But when we employ gelatine the bromide of silver formed therein does not subside but remains in suspension, while the by-product (nitrate of ammonium) remains in solution; hence they may be said to be in juxtaposition, and simple decantation will not achieve our object—it will not separate the one from the other. Here, then, we are in the presence of a difficulty which must be overcome. We must get rid of this by-product or it will crystallise on the surface of the dried film and render it useless, and the question arises how best to surmount it.

There have been already published five methods of eliminating the nitrate salt, and, with your permission, I will recapitulate them and say a word or two in regard to each in succession. First, we have the beautiful principle of dialysis; second, we have the method of pouring out to set in a dish and washing with a running stream or frequent changes of water; third, it has been recommended to pour the warm emulsion into a bottle and, holding it horizontally, to roll it round under a running stream from the tap until it has set in an even film round the sides; fourth, we have alcoholic precipitation; and, fifth, we have the method I wish to demonstrate to you this evening.

1. As to dialysis. Here we have an instrument—a bell glass—specially made with a returned edge for this purpose. We tie over the bottom a piece of bladder or parchment paper. We pour into the dialyser the warm gelatine emulsion so soon as we deem it ripe, stand it upon a support in warm water, letting the warm water come up its sides as high as the depth of the emulsion. Gelatine is a colloid body, and nitrate of ammonia is a crystalloid. This method of separating crystalloid from colloid was the discovery of Mr. Graham. He found that gelatine and other analogous colloid bodies would not pass through the septum—that is, the parchment paper—whereas the crystalloid salt would do so; hence, theoretically,

this ought to be a perfectly good and useful method. But it has one serious drawback—we cannot allow time enough for the operation, for our material may decompose and be useless when finished. Moreover, we can only apply it for small quantities; hence we may dismiss it as being theoretically perfect but practically almost useless.

2. Now we come to the second method of pouring out into a dish to set, and then washing by repeated soakings and changes of water, or with a running stream. This method is perfectly effective if you will give time, and can always determine *how much* time and *how much* water will accomplish your purpose. But, inasmuch as one does not always wish to make up an exactly similar quantity of emulsion—but one day may have requirement for a large quantity and another for a small—variation in thickness of film will lead to the obvious uncertainty that at the expiration of a given period of time the required amount of work has been performed. I think, therefore, No. 2 may be dismissed without further comment.

3. We have the method of pouring the emulsion while warm into a bottle, holding the bottle horizontally under a running stream from the tap until it has set round the sides. This plan, while open to the same objection as the washing in a dish, is more troublesome and difficult to perform. It is not always possible to prevent the formation of clots varying in size from that of a hazel nut to a walnut, and, these once formed, it is simply impossible to get rid of the whole of the nitrate salt by any amount of washing. It is none the less a very ingenious plan, and served me well on more than one occasion.

4. We come to the method of precipitation by alcohol. I found this method very useful to me when, for the want of a more effective plan *than either dialysis or washing* in dishes or bottles—when, in fact, the hot weather had nearly reduced me to despair—the gelatine would hardly set and the cistern water was tepid, and what was I to do? Necessity stared me in the face, and *who* can afford to despise necessity? Gelatine plates were required, and I must make them; but *how?* In this dilemma, after much cogitation, I suddenly bethought me of the result which sometimes comes about when that useful mountant, "parlour paste," is made, namely, the subsidence of the gelatine or dextrine when alcohol is stirred in, and I, at once, and for the first time under the sharp spur of necessity, saw clearly the principle underlying this subsidence. I could now understand that the strong affinity of alcohol for water caused the latter to leave the gelatine to unite with the alcohol, and I felt sure that in leaving the gelatine it would take with it the nitrate salt. I tried it, and with complete success. Others have tried it as I published it, and successfully. *One* gentleman, I know, precipitates with alcohol twice, and is a firm advocate for the *modus operandi* at this time. Another gives the emulsion a preliminary washing and afterwards precipitates with alcohol, and I am bound to say with the most complete success. Alcohol has also, I believe, a preservative influence in gelatine emulsion, and it certainly renders the task of coating the plates much easier. The emulsion flows more freely to the edges, and does not recede. Thus much for alcoholic precipitation.

5. Now for the method I published in The British Journal Photographic Almanac and *Year-Book* for 1878, and which I now proceed to demonstrate to you. I must premise that the emulsion has been made, that decomposition is completed, and that it has been poured into a dish, scraped up with an ivory knife, and transferred to this bag made of marking canvas. The box before you is made with sloping sides, which render a ledge inside unnecessary. To make my dish I employ two concentric oblong frames and this piece of calico. I do it in this manner:—I now fill the trough with water, and the tray is floating thereon. Two or three twists of the bag and one draw through the thumb and forefinger effect the purpose. The gelatine lies in the tray in extremely fine division, and I have reduced the time of washing from five or six hours to five or six minutes, and, what is better, the washing is well and perfectly done.

F. Wratten.

NOTES ON TRANSPARENCIES.

[A communication to the Edinburgh Photographic Society.]

Photographic transparencies are of various kinds, their manufacture much depending on the special end they are intended to serve. Probably at the present time the most useful description of transparency for us to consider is that which is simply a means to an end—the reproduction of negatives.

Many secret-mongers have profited not a little by being sharp enough to select some well-known good process, and by application master the working details or special peculiarities, and then for a consideration make known to the gullible that which they might have known by simply reading the weekly journals devoted to photography.

The conditions necessary for producing satisfactory transparencies for our purpose are a *structureless* film capable of rendering in a printable form all the detail existing in the original, and if the transparency is of such a nature as to permit after-modifications for the removal of objectionable portions or the addition of improvements, so much the better for the process.

In my own practice I find that for small transparencies gelatine is decidedly preferable to any other method with which I am acquainted. At one time I employed a commercial pigment tissue. When it could be obtained good this served its purpose well; but, as it was unreliable, I made some in small quantities, using a solution of alizarine as the colouring matter, which, being a purely transparent colour, produced a simple stain, and was eminently satisfactory.

The disadvantage of having to prepare my own tissue, the time necessary even when made to dry, &c., the slight uncertainty always attendant on pigment printing, and the several stages necessary to go through, made me eventually adopt a suggestion thrown out by our good friend, Dr. Thompson, and I tried a bromide of silver emulsion in gelatine. Here I found every good advantage of pigmented gelatine with a great number of advantages to which the latter could lay no claim.

I will hurriedly run over the heads:—1. Manufacture of emulsion (or pigmented gelatine): 2. Coating of glass or other support. 3. Drying. Thus far the pigmented gelatine and emulsion are similar, but from this point everything changes.

The pigmented tissue after having been sensitised rapidly deteriorates, and in a very few days is utterly useless. The emulsion improves by keeping, and when dry seems to keep indefinitely.

Exposure.—Pigmented gelatine requires a certain time, extending from minutes to hours, with the chance, not at all remote, of getting an imperfect print. The resulting print is unalterable in size, but gelatine emulsion only needs an exposure of a few seconds, and so long as we give *time enough* there need be no error. The film is absolutely structureless, the print is a stain of unsurpassable delicacy, the results are certain—no blistering, no frilling of the edges, no reticulation, no troubles as to solubility or insolubility, no fear of solid particles of pigment that are sure to come on the wrong place, and, the plates being ready for use at any moment by day or night, no anxiety, no floating, no drying.

I regret I am unable to give the exact formula by which I prepared the emulsion that produced the transparencies now on the table, but any good formula will do if it be only slow enough. I constructed mine after the formula of Mr. Aird's collodio-emulsion. With the salts as used by that gentleman I got a thin, blue film, so I greatly increased the amount of salts per ounce, and, if my memory serve me, I employed two and a-half times the quantity used in collodion. I think I used one ounce of gelatine to twenty ounces of water, and proceeded somewhat in this manner:—I divided the dissolved gelatine into two equal parts, added the bromide to one half, the silver (ordinary, at 3s. 3d. per ounce) to the other half, poured the bromide solution into the silver solution a little at a time, shaking well till all was thoroughly mixed and combined. I then placed the vessel containing the emulsion in hot water, so as to keep it fluid for some hours, shaking occasionally. Then I allowed it to get cold, broke up the jelly with slips of glass, and allowed it to soak in running water for a night, so as to remove the nitrates; then drained, added methylated alcohol to abstract a considerable quantity of water, drained again, warmed to redissolve the emulsion, and made up to the original quantity with methylated alcohol.

I made several pints at this time, have used it ever since, and shall be very sorry when it is finished, as it has proved the most convenient, simple, and reliable method I have ever tried for the production of transparencies. There are those who may think the transparencies on the table too thin to be really so serviceable as they are; but I can assure such that they are mistaken. It scarcely matters how thin they are so that all the detail is there. Some of us will be aware of the fact that a good glass positive of the times that are past will sometimes produce first-rate enlarged positives when employed as transparencies. Yet from the granular nature of the deposit they were much thinner practically than the gelatine film, besides possessing a considerable structure.

It sometimes happens that it is found advisable to make a large transparency instead of one the same size as the original negative. Here our gelatine emulsion stands alone for simplicity and certainty, for as yet we are unable to employ pigmented tissue in the camera. Then there are no large and expensive baths to make and to keep in order, no collodion to use and spill, no unevenly-coated plates, the size of the plate being absolutely immaterial. Not having tried larger than twenty-four-inch plates I do not think I could coat with collodion larger plates than that size; but I should find no difficulty with gelatine emulsion. First warm the plate, then level it on a table, pour a pool of hot emulsion on the plate, distribute it over the plate with a glass rod or piece of cardboard, leave till cold, and dry.

Let the exposure be long enough and develope; when all the detail is out fix with hypo. If the exposure have been very much over-done, and the development not in accordance therewith, the image may *possibly* be too thin. If so, intensify with ordinary acid pyro. and silver, having previously flooded the plate with a solution of iodine. Any amount of intensity immediately comes up, and there is much risk of overdoing it.

Now, if you are in a great hurry, and wish to make a negative the same size, flood with weak methylated alcohol kept in a bottle for the purpose; pour back into the bottle and drain well. Pour on some fresh alcohol stronger than the preceding, drain back into its bottle, and now pour on ordinary methylated spirit of full strength; drain, and the plate will be dry in a few minutes. When quite dry varnish with matt varnish, touch up as may be desired, and print your large negative direct by contact on another of your prepared plates.

I suspect the advantages of large transparencies are not so well known as they deserve. I believe if they were better known that better home-made enlargements would be sent out. From very inferior materials to begin with we may easily get very surprising results—altogether photographs without hand work—and superior, in regard to fidelity, to the hand-finished productions of the public companies and at much less cost; besides, when you do them yourself you get *exactly* what you wish. If you do not it is your own fault.

I am not disparaging the work of the public companies. I simply urge the merits of a method that any mechanical photographer can employ, and get first-rate results at a nominal cost—equal to or better than he can get done for him at a high price. As a practical example I lay on the table a *carte* which is of great value as being the only one in existence of a very celebrated lady. Copies the same size were required, besides enlargements and reversed negatives for collotype printing. The prints were required to look like pure, unmanipulated photographs. They were neither to look coarse nor flat. I first collodionised and burnished the *carte* and then took a *carte* negative of it, giving a very long exposure, and slightly under-developed the negative. From this small negative I produced the transparency before you as I have previously described. The touching up took but a few minutes. You can see the amount, and from this transparency I produced the *cartes*, cabinets, and imperials now before you. I think you will agree with me that they are better than the average run of direct portraits of similar size. They are absolutely faithful reproductions of the original small *carte*, every minute wrinkle and freckle being unobtrusively present, and no indication of enlarging, coarseness, or flatness being apparent after the most critical inspection.

Wm. T. Bashford.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The usual meeting of this Society was held on Tuesday evening, the 12th instant,—Mr. J. Glaisher, F.R.S., President, in the chair.

The Chairman, having announced that the Council had re-elected Mr. H. B. Pritchard as Honorary Secretary for the ensuing year, read a letter which had been received from Mr. Joseph Paget, in which he offered a prize of fifty pounds for the best dry process. [An article on this subject will be found in another page] This offer had been discussed at a meeting of the Council, and a committee had been appointed to carry the matter into effect. He proposed that the thanks of the Society be awarded to Mr. Paget for his liberal offer. The proposal was carried unanimously.

Captain Abney then read a paper by Dr. van Monckhoven, *On the Fading of Carbon Prints; and Carbon Printing without the Use of Bichromates.* This paper will appear in our next. Pending the publication of the paper, we may observe that Dr. Monckhoven expresses the opinion that the washing in water and subsequent treatment with alum will not perfectly fix a carbon print; he proposes, instead, the employment of a solution of bisulphite of soda. A portion of the paper was also devoted to the subject of the colouring matter of carbon tissue.

Mr. W. S. Bird, on being called upon by the Chairman, observed that the paper was a scientific one which required careful investigation. With respect to the alleged fading of carbon prints, he had looked out some of the oldest prints taken by his (the Autotype) Company, and the members had an opportunity of examining them, as they were hanging on the walls beside them. Several of these prints were over five years' old, and none were more recent than two years. In none of these pictures would there be found any indication of fading whatever. They did not contain any of the alizarine compounds alluded to, regarding which Dr. Monckhoven's experiments threw a suspicion and warning.

Mr. J. R. Sawyer, too, considered that the paper required careful investigation before he would offer any remark upon it. Of course experiments could be conducted in a variety of different ways, and there might be several methods by which alizarine colours could be prepared. So far as a reasonable test could be applied in a short time, the alizarine colours prepared by themselves (the Autotype Company) withstood the action of light to an unlimited extent. Before introducing these calours into their tissue he had had a careful interview with the producer of them, and he, too, had found them quite permanent. He would repeat the experiments of Dr. Monckhoven, whose method of preparing alizarine might possibly be such as not to give the most permanent results. Of course it must be borne in mind that Dr. Monckhoven had not been a tissue maker for a very long time; and, although he possessed great chemical knowledge by which he might be led to adopt what he considered improved methods, yet in regard to long experience his Company had an advantage. With respect to fading, it was very difficult to say what would *not* fade; even the pigments they employed to paint their street doors succumbed to the action of light and exposure. Their great effort was to endeavour to discover what pigment was *least* liable to fade, and if Dr. Monckhoven's experiments be correct he will have conferred a great benefit upon manufacturers of carbon tissue.

Mr. Jabez Hughes, in the course of some observations on what had been termed the *fading* of carbon prints, corrected a mistaken idea entertained on this question by a few who were imperfectly conversant with the subject. When a silver print faded it became of a sickly yellow colour, and sometimes disappeared altogether; but, if a carbon print faded, all that would take place would be a subduing of the ruddiness of its tone, which, in the case of some descriptions of tissue, was considered by many to be rather an improvement than otherwise. The whites, half-tones, and blacks could never possibly fade. But he doubted whether the experiments submitted by Dr. Monckhoven were fair examples of what they would get if the tissue in the market were experimented upon in a similar manner. He could testify to the fact of some carbon prints, at anyrate, having remained in an unchanged condition, as an instance of which he indicated *The Zealot*, by Mr. Blanchard, which several years ago formed the presentation print of the South London Photographic Society. The paper of Dr. Monckhoven was a valuable one, inasmuch as it opened up entirely new ground in carbon printing.

A vote of thanks was unanimously awarded to Dr. Monckhoven for his paper.

Mr. E. Cocking then read a paper *On the Non-Convergence of Perpendicular Lines in Architecture.* A discussion followed the reading of this paper, in which Captain Abney, Messrs. F. Bedford, Jabez Hughes, Sawyer, Davis, York, Bird, Vernon Heath, and others took part. The paper and discussion will appear in our next.

Thanks having been awarded to Mr. Cocking,

The Chairman announced that the next meeting would be held on April 2nd (the *first* Tuesday of the month instead of the second Tuesday as usual), and he directed attention to a large and very fine collection of pictures on the walls, exhibited by the Autotype Company, together with a very fine collection of works by Mr. Vernon Heath, which were to form his contribution to the forthcoming Paris Exhibition.

After an announcement that at the next meeting Mr. England would read a paper on *Dry-Plate Processes*, the proceedings terminated.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

At the last meeting of this Society, held on Thursday, the 7th instant, the Rev. F. F. Statham, M.A., President, occupied the chair.

Mr. F. Wratten read a paper on *The Elimination of the Nitrate Salts from Gelatine Emulsion.* [See page 124].

Mr. R. Kennett, in reply to a question by the Chairman, said he had no doubt the method described would answer quite well the purpose intended.

Mr. William Brooks, in response to a similar appeal, said he did not make use of gelatine emulsion; he much preferred a collodion emulsion.

A desultory conversation here ensued on the subject of collodion emulsion, and the probability of its superseding the use of the nitrate of silver bath. In the course of this Mr. Samuel Fry observed that he had recently, under Mr. Mawdsley's tuition, acquired a knowledge of the method of using emulsions with great satisfaction to himself and advantage to his business.

Mr. F. Bridge, too, bore testimony to the value of emulsion photography to professional photographers.

Mr. Adkins exhibited several gelatine negatives which had been developed by means of the ferrous-oxalate process of Mr. M. Carey Lea.

Mr. Cobb exhibited a variety of portraits taken in his studio on collodion emulsion.

A number of gelatine negatives were exhibited by Mr. Bennett, one of them being an interior of a room taken by ordinary gaslight, the exposure being one hour.

The Chairman having tendered the thanks of the meeting to Mr. Wratten, the proceedings terminated.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

THE Board of Management of the above Association held their monthly meeting at 160a, Aldersgate-street, on Wednesday, the 6th instant. The minutes of the previous meeting were read and confirmed.

An application for relief was then placed before the meeting, and after full investigation of the case the relief asked for was granted.

Mr. Lavender proposed and Mr. Thorne seconded—"That Mr. Emil Gromann be elected an ordinary member of the Association."

Grants for various purposes were issued, and after some general discussion on the business of the Association, the meeting was adjourned to Wednesday, April 3rd, at 8 p.m.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE fifth ordinary meeting of this Society was held at 5, St. Andrew-square, on Wednesday, the 6th instant,—Mr. John Lessels, President, in the chair.

The minutes of the last meeting having been passed, the following gentlemen were unanimously elected ordinary members :—Messrs. Yule, R. Pringle, W. Cruickshank, John Morrison, Jun., Wm. Jenkinson, John F. Pillans, John Heggie, C. E. Cowdell, Arch. Craig, R. H. Shaw, and James Stoddart.

Mr. W. T. BASHFORD intimated that since he had arrived at the meeting a very important paper by the Rev. H. J. Palmer, M.A., had reached him, and that he would immediately read it to the Society in place of that indicated in the billet, as he believed it would be of far greater value and much more acceptable than that to which his own name was attached, and which really was only an apology for a paper, the committee of management having unexpectedly found themselves at the last moment short of matter for the present meeting. The paper alluded to will be found on page 123. It was illustrated by a large number of examples, including some very perfect film negatives—the latest outcome of the author's investigations; also several cardboard dark slides in various stages of manufacture, and an admirable substitute for glass as a focussing-screen, the latter being a tough sheet of gelatine resembling fine horn, prepared as described by Mr. Palmer in his paper. The cardboard slides are very ingenious, compact, light, and admirably suited for use in conjunction with the above screen. Their mode of manufacture will be found in a paper contributed by Mr. Palmer to the Liverpool Amateur Photographic Association [*ante* page 110].

After the members had examined the negatives a lively and interesting discussion ensued, much surprise being generally expressed at the exceedingly short exposure given to the negatives, and also to their uniform freedom from stains and other imperfections.

Mr. W. H. DAVIES said that he fancied the gelatine negatives exhibited (except one, an interior) indicated those unfortunate peculiarities common to all dry processes that had come under his notice, namely, under-exposure and a liability to halation. He did not in any sense undervalue the advantages of the process, but he believed that as yet there was no *dry* process that could give the delicacy of detail and tender gradation of light and shade that can be obtained by the old wet process. He (Mr. Davies) directed the particular attention of those who might employ a glass plate in front of the film during exposure to the necessity of selecting such plates with the utmost care, as the slightest scratch or bubble appeared as a glaring black defect in all prints, as those knew to their cost who were in the habit of making reversed negatives by copying carbon transparencies through the glass.

Mr. BASHFORD said he was personally indebted to Mr. Palmer, and so was everyone interested in photography, for so kindly supplying the important details of that process which Mr. Palmer had made so peculiarly his own. The information came with authority. They had now a truly reliable process thrown open to them—a process that combined exceeding rapidity with certainty, and one that supplied absolutely structureless negatives of infinite value for the production of enlargements. There was no difficulty in reproducing the most delicate detail, and the defect of hardness could be wholly overcome by supplementing a suitable exposure by a suitable development. He (Mr. Bashford) understood that the gelatine films were sufficiently rigid to be used without glass plates in front of them, and in that case, of course, their attendant evils so judiciously pointed out by Mr. Davies would not exist.

Dr. NICOL considered that Mr. Palmer had very nearly solved the problem of a substitute for glass. He had seen nothing so likely to turn out a real success, and believed that even these were inferior to what would soon be obtained. The best thanks of all amateurs would be awarded to Mr. Palmer, for he doubted not that thousands would use the process during the coming season, and that they would find it thoroughly successful.

Mr. PRINGLE directed attention to the marvellous detail of the negatives. One very trying subject was peculiarly well brought out—a distant flagstaff against a clear sky. It was so small and fine that a magnifying glass was necessary to distinguish it, yet when so examined it was found to be as sharp as if it had been engraved.

Mr. ALEXANDER MATHIESON thought Mr. Palmer had not done his process justice when he called it "slow." He noticed that many of the negatives exhibited had only received an exposure of thirty seconds instead of thirty minutes, as would most likely have been given if the beer process, which had once been the favourite of the Edinburgh amateurs, had been employed. He believed that this process was a very great advance in the right direction; at anyrate he would certainly adopt it on his first trial trip, and would lay the results before the Society.

Mr. J. G. TUNNY remarked that the non-actinic colour of the film was very deceptive, and he generally found a difficulty in printing from gelatine plates. He could get four or five prints from ordinary negatives during the time it took to get one print from a gelatine film. He recommended that the negative be always toned to the colour of an ordinary negative. By doing so the disadvantage in printing was materially lessened.

At the conclusion of the discussion, on the proposal of Dr. Thompson, seconded by Mr. Tunny, a hearty vote of thanks was awarded to Mr. Palmer.

Mr. Bashford was then called on for his paper as in the billet, and as some members would take no denial he read some *Notes on Transparencies.* [See page 125].

An album of beautiful Indian views was submitted to the meeting by Mr. W. Leitch.

The usual votes of thanks terminated a very interesting meeting.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

A MEETING of this Association was held on Tuesday, the 28th ult., at the Religious Institution Rooms,—Mr. John Urie in the chair.

The minutes of the previous meeting having been read and approved,

Mr. BIRRELL gave an interesting description of his patent automatic apparatus for the manufacture of oxygen gas, and exhibited the oxy-hydrogen light in the lantern. The pictures on the screen were sharp and clear, and the light was very steady. The gases were very quickly made, and the apparatus was quite under control.

The CHAIRMAN asked if it would not be a good thing to have a safety valve on the retort.

Mr. BIRRELL replied that it could easily be done, but he did not think there was any need, as it was quite safe.

Mr. ROBERTSON said the greatest danger in making oxygen gas arose from using impure manganese.

Mr. Birrell was heartily thanked for bringing his apparatus before the Society.

Mr. M'Hattie showed a negative taken on one of Truefitt's dry plates; it was exposed in Mr. Stuart's studio. There was a wet plate exposed at the same time, and it was found the dry plate was the quicker.

Mr. ROBERTSON was present when the plates were exposed, and had no doubt the dry plate had the advantage in speed. He thought the emulsion process was to do good service in the future of photography.

The CHAIRMAN then read some remarks, in which he congratulated the members on the successful issue of their endeavours in preventing a renewal of Swan's carbon patent. The result, he thought, would be the harbinger of great good to them all, and impel their energies in the way of progress. He concluded by suggesting the formation of a printing company in Glasgow, which, having relation to a matter of purely commercial enterprise, need not here be entered into.

A vote of thanks to the Chairman for presiding brought the proceedings to a close.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE ordinary monthly meeting of this Society was held on Wednesday, the 6th inst.,—not at the usual place of meeting, but at the residence of one of the Vice-Presidents, the Rev. W. J. Whiting—the President, Mr. W. W. Stoddart, F.R.S., F.G.S., in the chair. The minutes having been read and confirmed, the President called upon Mr. E. Brightman to read his paper, entitled *Whims of a Landscape Photographer.* [The paper being received at the last moment, we are obliged to defer its publication till next week's issue.]

The PRESIDENT, in remarking on the interesting character of Mr. Brightman's paper, could not help differing from him in regard to his remark as to distilled water. He much doubted the existence of organic matter in it if properly distilled—that is to say, the first eighth of the water that came over should be thrown away. He (the President) also preferred alcoholic ammonia one part, rouge one part, and water one part, to Mr. Brightman's formula for cleaning plates, having always found it most satisfactory when cleaning microscopic glass. Ammoniacal alcohol, he remarked, differed very much from ammonia, as all liquor ammonia contained a certain degree of tar, which the former did not.

The Rev. W. J. Whiting had generally used saturated solution of bichromate of potash twenty ounces, sulphuric acid one ounce, for cleaning plates, and had found it most certain in its work, the plates being immersed in it.

The Rev. W. J. Whiting then introduced Mr. Keevil, the inventor of the ingenious lantern, and, speaking of the honour he felt at having the inventor of such a scientific piece of apparatus present at the meeting, dilated on some of the chief points of the lantern.

Mr. Keevil then clearly explained its construction and working. The lantern is a single one with a cone and lens in front, in the ordinary form, and another at nearly right angles projecting from one side. The lens in the latter is prismatic in its construction, so that the rays of light are taken up by the lens and reflected at nearly right angles to the screen, the adjustment for superposing the discs and focussing being most perfect. Quite contrary to the almost matter-of-course prejudice, the light of the prismatic lens—that is, the lens *parallel* to the screen—is, if anything, a little the more powerful of the two. The automatic arrangement for moving the lime light and dissolving the pictures simultaneously was greatly admired, as was the whole demonstration.

Votes of thanks to Mr. E. Brightman and Mr. Keevil brought the meeting to a close.

Correspondence.

Photography at the Forthcoming Paris Exhibition.—Hints to Intending Exhibitors.—The Transit of Mercury.

The scheme under which the French Section of Photography at the Paris Universal Exhibition of 1868 is being carried out is as follows :—

A jury for the admission of exhibitors in Class 12 was appointed by the French Government; this jury appointed a certain number of its members to act as a Sub-Committee of Installation. Voting papers were then sent out by the jury of admission to each exhibitor, submitting to them a list of four names for their selection of two of them; those having the majority were added to the Committee of Installation. This was the only partially-free election the exhibitors were called upon to perform. This Committee contract with the exhibitors—about 200 in number—

1. To construct a *salon* or court for Class 12, which is about thirty-five yards long by seventeen and a-half yards wide, subdivided by screens into three saloons, in which will be exposed the entire collection of the pictures of the French photographers. The works of each artist will be hung together by the Committee—a matter of great importance, presenting under the best light and in the most agreeable manner *un grand ensemble.* In the Paris Exhibition of 1867, if I remember rightly, a great outcry was made against the system under which the contributions of the English photographers were hung; for they were scattered, more or less, about here and there wherever a vacant spot could be found, which produced a failure as regards the importance, the easy and just estimation by the public of their intrinsic value, and the general artistic effects of their united labours.
2. To furnish and fix up in the most artistic and scientific way the *velum* of linen and muslin (no easy matter in the present atrociously-ugly building) for the proper lighting of the saloons.
3. For the general decoration of the saloons.
4. To provide uniform glass cases for instruments, lenses, &c.
5. To fix the necessary *tablettes* and elbow-rests before the pictures.
6. To insure against fire all objects and decorations common to the saloons.
7. To nominate and pay the keepers, and to clean daily the saloons, pictures, frames, and glasses.
8. To insure against the breakage of glass, from whatever cause, during the exposition.
9. To pay a certain sum to the general administration for the expenses of the decoration of the chief passage.
10. To keep a sum in reserve for any unforeseen general expenses.
11. At the close of the exhibition the balance in hand will be returned *pro rata* to each exhibitor. The charge for wall space to exhibitors is £3 per square yard, and £8 for glass show-cases.

For the Vienna exhibition the arrangements were more consistent with the principles of self-government, for the exhibitors assembled together and elected MM. Davanne, Rousselon, and myself their delegates, and gave us the necessary powers to fully represent them without the unnecessary interference of officials. Great economy and most excellent results were the consequence; for out of £2 per square yard charged the exhibitors for wall space we returned about twenty-five per cent. of the amounts collected, and for which sum we built and decorated an excellent court or saloon for the exhibition, allotted equitably the space, hung all the pictures, cleaned them and the court daily, protected the same with guardians, unpacked and repacked the pictures, stored away the packing-cases, and arranged with the railway companies a very low scale for the transit in one lot of the whole of the packing-cases, with a cheap return fare from Vienna and delivery at Paris. The whole operation was a great success, both financially and artistically, and exhibitors were well recompensed with numerous prizes.

From the experience I gained at the Paris Universal Exhibitions of 1855 and 1867, and also of Vienna in 1873, where I gained a medal of progress, I should recommend that the glass of each picture frame sent to Paris this year should be insured during transit, and that bands of stout brown paper about two inches wide should be pasted in parallel lines all over the glasses, leaving not more than about an inch of space between each band. When this is done there should be pasted on the top of these rows of bands, at right angles to them and with the same separation apart, a second row of brown paper bands, and so intersecting the whole surface of each glass as a means of security against breakage. I always do so with mine, and glass-covered pictures, one yard long, to Vienna or England have always arrived in perfect safety. Even in the event of a regular smash there would be no loose, broken pieces to lacerate and utterly destroy the prints from the constant shaking during the voyage. I would also diminish as much as possible the number of packing-cases, and so reduce the expenses of transit and storage of them during the exhibition. I would further suggest that the whole body of English photographic exhibitors in Class 12 should unite together and appoint a sole agent for the reception, unpacking, and placing their pictures, &c., in the hands of the exhibition authorities; storing the packing-cases away until the close, and repacking and delivering them to the railway companies for return to England; to keep clean the objects exposed; to take measures to rectify articles or pictures damaged or broken; and to represent generally the exhibitors during the period the exhibition remains open. This arrangement would be more efficacious as well as economical to the exhibitors individually, as I have shown by the Vienna results. It was with this view I offered my services to my *confrères.*

M. Vidal will have a court to himself, and will exhibit and work the machines and the process by which he produces his admirable reproductions in photochromy, and will also illustrate the whole manipulations of Woodburytype.

M. Walery will exhibit pictures in carbon, silver, and enamel, and in order to do justice to his art-creations has established in his *ateliers* the different branches for preparing himself all the works he will exhibit.

The Academy of Sciences has organised a scientific mission which will observe the transit of Mercury across the sun's disc, in the neighbourhood of Payta, upon the coast of Peru. The direction of this scientific mission is confided to M. G. Fleurias, who in 1874 directed with so much success the mission charged to observe the transit of Venus at Pekin. M. Fleurias has for his second in charge a naval officer, M. Lemercier, whose works have attracted to him the attention of the learned members of the Academy. The Minister of Public Instruction has charged M. Ch. André with the direction of another mission to whom M. A. Angot has been added as second in charge. Both missions are furnished with the instruments which were used during the great expeditions of 1874. M. Maindron, Secretary of the Academy of Sciences, was charged to send off to Valparaiso the cases containing the instruments destined for M. Fleurias on board the "Magacienne," of the French navy.

The planet Mercury will pass before the disc of the sun on the 6th of May, and will be observed from a most favourable station chosen by the Institute of France, namely, at Ogden, in the state of Utah, North America, by M. Angot, who has been going through a course of instruction, under the direction of M. Davanne, in the Taupenôt and the bromide of silver emulsion processes; and from the well-known capability of M. Angot we look forward to interesting results from a photographic point of view. MM. André and Angot observed the passage of Venus in New Caledonia; and a millionaire, a friend to science, M. Bishoffsheim, has placed at the disposal of the two travellers £1200, which was the sum necessary for their voyage. They start by the Transatlantic Company's service *via* Havre.

Asnières (Seine) Paris. W. Harrison.

THE CONSTRUCTION OF GLASS HOUSES.

To the Editors.

Gentlemen,—In The British Journal of Photography of the 22nd ult. I recommended the combination of blue and clear glass in glazing a studio. Having had many inquiries as to the practical advantages to be gained by it, I thought perhaps there might be others I have not answered by letter who would like to know my reasons for suggesting such.

As a starting-point, let any photographer take a thoroughly good photograph as regards lighting, full of half-tone, round, and brilliant. Have this as your standard and compare it with every picture you see, either in your own album or with your ordinary work. Even compare it with the photographs you will see in a publisher's window, where you will find good work by many different photographers. There will be many of them very good, and in some otherwise good you will find there is a deficiency of half-tone in the light side of the face. It is too white. They may be brilliant, but there is neither indication of modelling or texture. A little consideration will compel you to acknowledge that fifty per cent. of the photographs taken are spoiled by a too powerful direct, low side light.

How strongly some photographers do "stick" to the erroneous idea that to produce good full-length pictures it is necessary to use side light down to the floor! The effect of low direct side light is to make a deficiency of half-tone on that side of the face, destroying the beautiful modelling there should be round the corners of the mouth, the chin, down the side of the nose, and round the eyes. What is more beautiful than the ear when lighted so as to preserve all half-tone, which is also lost? It makes the face broad, hard, and devoid of all texture; makes the shadows too heavy, necessitating reflection; and brings retouching to a maximum in endeavouring to produce softness by piling on lead pencil and colour in the shadows of the face. How few photographers have been able to produce those beautiful effects—the face in soft shadow and the strongest light falling on the ear and temples—simply because they have used the side light too strong or the strongest light too low!

I will endeavour to explain how all these defects can be reduced to a minimum by the combination of blue and clear glass. I do not hold that the dimensions of the studio should be fixed. A good picture can be made in any ridge-roof studio where the light is brought well into the room and the eaves are not too high.

In answer to one correspondent who is about to alter his studio I advised him to have the eaves seven feet high, six feet opaque at each end, the side light glazed to within three feet of the floor, and five feet at each end of it to be blue glass, the light eighteen feet long, instead of ten feet, as it is at present. The blue glass in each end of the skylight to be two feet wide, with the sunshade and four spring roller blinds on the roof, it will be a very easy matter to produce good pictures as regards lighting, and very quick. I mention this to show that the blue glass will require special treatment according to the peculiarities of the studio. I acknowledge that blue glass is *slightly* slower than clear glass; and if it were not so it would not have the desired effect, as it softens the light and gives a coolness to the half-tone without producing harshness or a glare, which is so often produced by blinds. As these two latter points are so destructive to a natural expression, they require more consideration than many photographers have given them.

The practical advantages to be gained by its use are—1. A beautiful soft effect on the light side of the face, with every degree of half-tone. The light from the clear glass above gives those delicate and sharp lights on all prominent parts so necessary for excellence. 2. The modelling is a delicate, cool grey, and not so easily lost in development. 3. It makes the shadows very soft, and dispenses with reflection *(a very important point)*. 4. It wonderfully reduces retouching. 5. It gives the power of using more light without the loss of any roundness or brilliance, and consequently shortens the exposure.

As regards a south light, so highly recommended by Mr. Webster in the Journal of the 1st inst., I certainly think that in some cases it would be as useful as Mr. Webster states. Supposing a studio of the dimensions given by Mr. Debenham in the Journal of the 8th inst., the eaves being not less than eight feet (a steep pitch is generally supposed to be at an angle something above 45°)—but supposing, I say, 50°, this will not be very steep, but even with that and the ridge not more than twelve or thirteen feet high, the light would only be brought into the room about four feet; and, as Mr. Debenham gives the width of the room as fifteen feet, it would leave eleven feet opaque. For single figures, and especially the so-called Rembrandt effects, this would be a very good studio, but the south light would be found most useful in it, as there would be very little light from the walls of the room; they are so far from the light, and the shadows would require lighting a little in many cases (even for single figures) either by reflection, *which ought to be avoided if possible*, or by direct light. The difficulty would be increased when taking large groups in a studio of these proportions, as the figures nearest the opaque side would not have so much light as the others, and would be compensated for by light from the south side, producing a cross light, which would be wrong.

It is not a studio for one special class of picture that will meet the requirements of the photographer of the present day, but one that is capable of producing any and every effect with the greatest simplicity. Under the latter heading neither these proportions or a south light can take the first place. Undoubtedly a south light would be useful for an occasional study. The one aim in the use of blinds, head-screens, reflectors, &c., is to produce a broad, soft light with a predominating light from one point. The simplest way to achieve this and secure the best effects is to bring the light well over the sitter. As the glass recedes from the sitter at different angles it partially produces the broad, soft effect without assistance; but the direct light overhead, and especially at the side, requires softening to get the required half-tone. If blinds are used it makes the front light predominate, and consequently produces flatness; the use of blue glass, as described, remedies these defects, giving the power to use the whole light in most cases.

Before concluding I will give the dimensions of a studio that would be best suited to the combination, and in which a south light would be of no service:—Width, fourteen feet; ridge, thirteen feet high at a point nine feet from the glass side, and five feet from the opaque side; length of light, eighteen feet; eaves, seven feet high—six feet opaque at each end if possible; blue glass only in the side light to within three feet of the floor, and also blue glass at each end of the skylight two feet wide; clear glass in the remaining portion. The south side and roof to be opaque, with the sunshade four feet wide, and at an angle of about 45° with the ground, and four spring roller blinds working from the top. It will not be necessary to have blinds on the side light.

This will be found a most useful studio, producing any effect at will with the greatest simplicity. It will not be quite as quick as the modifications of Mr. Hamilton's plan in *dull* weather, but both will produce equally good pictures. There will not be quite as much freedom for the use of a background in Mr. Hamilton's dimensions as Mr. Webster states. I also pointed this out, with the means of partially remedying the defect. The suggestion by Mr. Webster to get more than thirty feet in length would be found most useful. How many photographers there are that would have one or two foregrounds made up on platforms of a few inches high if they only had a convenient place to put them out of the way! This, if carried into effect, would be found most useful, as there is no limit to the number of imaginary foregrounds that could be made up at spare moments, ready for use when there is a rush of business. The platforms, if on castors, would be easily moved to any desired position without making a "dirty mess." This would necessitate sweeping up and making a dust before the next sitter could come in, which would be a waste of time and patience, if they were waiting.

As a concluding remark, I would say use less powerful side light and more sky light, and you will give more satisfaction.—I am, yours, &c.,

Ryde, March 9, 1878. J. Cowell.

IMPROVEMENTS IN CARBON PRINTING.

To the Editors.

Gentlemen,—We confess to some feeling of surprise in reading in your issue of last week a letter signed by Mr. J. R. Johnson under the above heading. This letter deals in *inuendo*, in mysterious allusions, and is highly seasoned with personalities; but we look in vain for any contribution likely to be of use or of interest to your readers.

We should be extremely sorry to follow Mr. Johnson's lead into personalities; the intrusion of such discredits the writer and renders no service whatever to the discussion of the subject.

Mr. Johnson has chosen to single out Mr. Sawyer for his strictures, styling him the "mouthpiece" of the Company, attributing to him various faults of temper, &c., &c. All this is nothing whatever to the purpose. All correspondence signed by the Autotype Company is written and revised jointly by the partners, and when Mr. Johnson assumes that Mr. Sawyer is the "mouthpiece" of the Company, and points his strictures with personal offensiveness, he simply commits an act ef gross discourtesy.

The simple fact remains that Mr. Johnson misquoted the *Manual*. Surely the present editor of that work was perfectly in order when he called the attention of your readers to this fact, and laid before them what the *Manual* actually did say. Had Mr. Johnson retracted in a fair and honourable manner the discussion would at once have ended; but, on the contrary, whilst professing to regret his inadvertency, his explanations have actually aggravated the original injury.

It is a little strange that these representations should coincide in time with Mr. Johnson's attempt to prospect a new patent, an important part of which relates to the production of photographs in permanent pigments. It seems as if by some "unconscious cerebration" Mr. Johnson had made his quotation square with his own ideas rather than with published facts. Mr. Johnson now goes further, and raises doubts as to the success of the Autotype Company's methods of producing permanent tissues.

For eighteen months we have sent out all our single-transfer prints, amounting to hundreds of thousands, in tissue made with permanent pigment, the basis of the formula for which was given to Mr. Johnson in May, 1876. For twelve months we have replaced the cochineal in our ordinary tissue (those made to special formulæ only excepted) with the new permanent pigment, and though we are not prepared to assert that in such a difficult and critical business as the making of tissue absolute perfection h s always been attained, there have been no difficulties attendant upon the employment of the new permanent colour that have not been entirely overcome, and we have the satisfactory experience of a very large body of our customers to oppose to that of Mr. Johnson and his "intelligent *employé*."

What can Mr. Johnson mean by posing himself as a person possibly "inimical" to the Company, and suggesting that it was a mysterious and unlikely thing that Mr. Sawyer should confide to him his experiments? Is Mr. Johnson, then, unconscious that at that very time, and even at the present moment, he is, *de facto*, a sharer in the profits of the Autotype Company? It is true that at a time when autotype looked "dangerous" he exchanged his ten years' interest in the profits of the Company for a lump sum of money down, but the commutation of this reward can scarcely have absolved him from the loyal co-operation contemplated in the original deed. Under these circumstances it does not seem unlikely that Mr. Sawyer should, whilst enjoying the hospitality of Mr. Johnson at his charming retreat at Neuilly, talk over the hopes and fears, the progress and processes, of autotype; and what more likely than that he should communicate to Mr. Johnson in May, 1876, the progress he had made?

Mr. Johnson is bound by agreement to give the Autotype Company the refusal of any novel invention in carbon printing patented by him; in the present case this *devoir* has not been neglected.

To Mr. Johnson's overture we (as men of business) replied that, in addition to the specification, practical proof of its commercial value must be produced before terms could be discussed. Mr. Johnson promised that with the assistance of his friend, Mr. Oliver Sarony, he would produce examples of his improvements, and give us the data upon which to form an opinion. We are not conscious of having ever injured Mr. Johnson in word or deed. It is certainly through the present proprietors of the Autotype Company that he has ever received anything approaching an adequate acknowledgment of his eminent services to carbon printing, and certainly one of the partners exerted himself considerably to secure him advantages both in France and the United States. The general question of improvements in tissues and in processes for permanent photographs cannot be neglected by ourselves, and is of some importance both to the profession and the public; and surely Mr. Johnon will be employed to greater advantage in producing better materials and more perfect tissues, and thereby adding to the honourable services already rendered to a good cause, than by publishing misquotations "from memory," appropriating other peoples' inventions "by inadvertence," or by casting injurious reflections on gentlemen who were once his co-workers and believed themselves until quite recently to be his friends.—We are, yours, &c., THE AUTOTYPE COMPANY.

March 12, 1878.

[This discussion has now arrived at the stage at which it may be fittingly terminated.—EDS.]

ANSWERS TO CORRESPONDENTS.

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

RECEIVED.—M. Carey Lea. In our next.

SYNTAX.—The process you suggest for producing chromotropes by means of photography is excellent. But can the requisite variety in pattern be obtained?

W. F. BROWN.—The perfection of top light may be obtained even with a single sloping roof, provided, of course, that the slope be carried to a sufficient distance over the head of the sitter.

F. O. B.—To produce an enlarged print by means of the magic lantern you must make use of a *much* more powerful light than that produced by your paraffine lamp. Try the magnesium light.

R. M. C.—It is probable that the water of which the bath has been made is impure. Render it neutral by the addition of a solution of bicarbonate of soda, and expose it to sunlight for a day; then filter and slightly acidify.

A. EPPS.—It is probable that the fogging propensities in your lens arise from the brasswork inside not being *dead*. Try the effect of coating the interior of the tube with either a thoroughly mat black varnish, or of lining it with black velvet.

CONSTANT READER.—The common protosulphate of iron as sold to the dyers will answer your purpose sufficiently well. Try one picture by it, and another by the ammonio-sulphite, and see which produces the better result. Tone after fixing.

REV. J. THOMAS.—The ferrotype plates which form such an important element in the construction of the telephone are those in common use for taking cheap collodion positives. They can be procured from nearly all dealers in photographic materials.

A. B.—If you read carefully Mr. Hare's specification you will find that he does not make any claim to be the inventor of "changing-boxes," but of a special kind of mechanical adaptation by which an improvement upon the original changing-box has been effected.

SUBSCRIBER.—From your statement of the matter we incline to the belief that you will gain the case, provided it be carried farther. But you know the old saying—"one story is good till the other story is told;" and in the meantime we have only heard one side of the story.

"LITTLE CARBON."—We cannot tell from a mere inspection of a carbon print whether the purple pigment contained therein is permanent or not. We would require to know the nature of the pigment first, and even then we might not be able to speak with confidence as to its permanency.

C. J. (Leeds).—We presume that by taking from the medallion a cast in stearine, and from that mould obtaining a cast in plaster of Paris, a *facsimile* of the original would be produced. If several casts are wanted it will be advisable to utilise the excellent reproductive properties of the electrotype.

H. E. D.—Instead of an ounce it should have been half-an-ounce. This gives the proportion mentioned. One drachm of a one-hundred-grain solution will contain a little over twelve grains. We are quite ignorant of the nature of the plates mentioned, knowing nothing concerning them except what has appeared in this Journal.

BLISTERING OF PRINTS.—A. M. R. (Aberdeen) wrttes as follows:—"If your Havana correspondent would take the advice given by Mr. J. Stuart, in the ALMANAC for 1878, page 78, blistering of prints would be a thing of the past I have found it a perfect preventive of blistering; and I may mention it is used in the largest printing establishment of this town with the same success."

K. P. T.—Although a solution of Castile soap in alcohol has been much employed as a lubricant for prints when subjecting them to the action of the burnisher, an ethereo-alcoholic solution of wax is now beginning to supplant it, the latter being alleged to have several valuable qualities which the other does not possess. The formula for this preparation is as follows:—

White wax	120 grains.
Ether	2 ounces.
Alcohol	16 ,,

The wax is scraped into shavings and dissolved in the ether, after which the alcohol is added. When it is to be used the bottle must be shaken so as to mix up through the liquid a white sediment that falls to the bottom after standing. This mixture is applied to the photograph by means of a sponge. We believe that benzole will make quite as effective a solvent for the wax as the ether and alcohol in the foregoing formula.

R. SUTTON.—There is rather too much water in the solution. We have found a suitable bleaching fluid to consist of eight parts of water to one part of a saturated solution of bichloride of mercury in hydrochloric acid. This mixture is improved by the addition of a little alcohol and nitric acid.

H. M'GILL.—Your error consists in not having allowed the gelatine sufficient time to soak in the cold water previous to applying heat. Obtain a basin capable of holding a quart, half fill it with gelatine, and pour in cold water in such proportion as to stand above the top of the gelatine. Allow it to stand for three or four hours, then drain off the superfluous water, and place the vessel in a hot oven for a few minutes, by which the gelatine will be liquefied. Then add the alcohol.

J. Y. (Manchester).—The instrument in question consists of a wide tube bent like a U, one of the limbs, however, being bent outwards near the top, something like the spout of a porcelain teapot. Any viscous fluid, such as albumen, is poured *in* at one limb and *out* at the other. The formation of air-bubbles is thus avoided. Of course the tube must be very wide, and a plug of tow may with advantage be inserted loosely so as to ensure the filtration of the liquid previous to being poured out.

G. P. W.—Seeing that the lens has a focus of eight inches it is imperative that, in order to produce a transparency of the same dimensions as the negative, the camera be constructed in such a manner as to enable the focussing-screen to be placed sixteen inches from the centre of the lens. The negative must also be placed at the same distance from the lens. If the transparency be required to be twice the dimensions of the negative, or two diameters, then the camera must be capable of being expanded to at least twenty-four inches, the negative being twelve inches from the lens.

G. L. LEE, Jun.—The best way to apply bronze powder to the gelatine surface is to make use of a large camel's-hair brush, the hair of which has been shortened very much, first, by cutting with a sharp knife, and then pressing the stump against a bit of hot metal until the surface is burnt in a uniform manner. Now rub the stump against a piece of coarse emery paper, and the brush is complete. The bronze powder should be of the *fine* kind about which we wrote a fortnight ago. Brush it well into all the interstices, and when the gelatine presents a uniformly-coated surface immerse in the solution of sulphate of copper, a one-pint Smee's battery affording sufficient electric power to effect the coating.

EXCHANGES.—In our next.

NON-ACTINIC MUSLIN.—We have received from Mr. J. Solomon, 22, Red Lion-square, a sample of a new description of non-actinic muslin he has prepared. It is of a rich ruby-orange colour, is very transparent, and must prove very useful now that such an exalted degree of sensitiveness has been obtained in our films.

GELATINE NEGATIVE FILMS.—We have received several specimens of gelatine negative films exhibited at the recent meeting of the Edinburgh Photographic Society, in illustration of the interesting communication made to that Society by the Rev. H. J. Palmer, M.A., which will be found in the present number of the Journal. These pellicles are exceedingly uniform, and the experiments of Mr. Palmer will necessarily prove of great value to photographers.

PHOTOGRAPHY IN COURT.—PORTRAIT CLUBS AGAIN.—At the Bloomsbury County Court, on Tuesday last, the case of Bowell *versus* Pearce was heard before Mr. Judge Russell. The plaintiff, a licensed victualler, carrying on business at the Artichoke Tavern, Kentish Town, sued the defendant, a photographer in Malden-road, Kentish Town, to recover the sum of twenty-one shillings—money paid to the defendant's portrait club—and for which sum the plaintiff was to receive a handsomely-framed portrait similar to one placed in the plaintiff's bar for inspection, and which, together with one sent to the plaintiff, were both in court. The Judge asked the plaintiff what he had to complain of. The plaintiff requested his honour "to look on this picture and on this," as the one he received was very inferior to the one he expected to receive, and consequently he declined to have it. The defendant said the plaintiff did not sit for the portrait in question, but requested him to enlarge a guinea club-portrait from a *carte de visite* taken by another photographer. He told the plaintiff he had better sit again, but he refused, as he said his wife persuaded him to have the original copied. It was one to which the plaintiff's wife was partial, it being taken prior to their marriage. (Laughter.) The Judge, looking at the portrait in question, considered it was a very fair reproduction of the *carte de visite*, although not perhaps so good a likeness of the plaintiff since his marriage as it might have been before; but as the plaintiff had, like every wise man in trifles like these, consulted the wishes of his wife, still the defendant could not be held liable for them, as he had simply done what he was ordered to do and no more. Therefore judgment must be entered in his favour with costs, and the plaintiff was entitled to the picture.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 933. Vol. XXV.—MARCH 22, 1878.

ON THE PRODUCTION OF ACTINOMETER SCALES.

In continuation of our article of last week we now proceed to detail the later methods we have adopted with greatest success. With gelatine our *modus operandi* was as follows:—A solution of gelatine, of the strength of about fifty grains to the ounce, was coloured by the admixture of a small quantity of Prussian blue as supplied for artists' use in the moist state. Other means may be adopted; the readiest would, perhaps, be to utilise the laundress's "blue-bag." Whatever the means employed we should recommend blue as the colour, presenting, as it does, the strongest colouring power with the least obstruction to the action of light. The coloured gelatine was extended, in the ordinary manner, upon a plate of waxed and collodionised glass, and when dry stripped and exposed in the manner of ordinary tissue; or the exposure may be made through the glass, though this is not recommended. The attachment to the developing support would, probably, be best performed by means of india-rubber, but we made use of glass prepared with gelatine and chrome alum; this was moistened with water and allowed to drain, and the exposed tissue applied to it in the dry state, the collodion side next the glass, and pressed into contact with the squeegee, a sheet of clean paper being interposed. After an interval of ten minutes the development was proceeded with in the ordinary manner. We may, however, call attention to the necessity for more than ordinary care at this part of the operation. The development should not be hurried by laving the film with warm water, as is ordinarily done, as this would cause a tendency to inequality. A gentle rocking of the developing tray and plenty of time must be allowed to do the work.

When the development is completed allow the plate to rest for a few minutes in cold water, and then rear it up on blotting-paper until it becomes surface dry; it is then in a condition to be treated with the chemical colouring agent, which may be potassic permanganate or ferrous sulphate followed by pyro. The latter is the one we prefer, and we recommend the use of very weak solutions, the treatment being repeated if the first application prove insufficient.

The plates we have experimented with were of the quarter-plate size, and the number of tints sixteen. The exposure was effected as follows:—A piece of stout card the size of the opening of the printing-frame (four inches by three) was ruled with a series of lines a quarter of an inch apart, and parallel with the shorter side. The lines were then partially cut through with a sharp penknife, so as to enable the card to be easily folded at each cut. This mask was then fitted into the front of the frame, and by folding back each strip in succession at certain intervals of time a series of sixteen tints was obtained with ease and regularity. The plate when finished may be cut into three or four narrow strips, and will then form as many scales, which will all be uniform.

As may be easily understood, the length of the successive exposures is a matter requiring a considerable amount of care and calculation, in order to secure a series of regularly-progressing tints. It is a well-known fact in silver printing that a comparatively short exposure to light suffices to produce a distinct and marked difference in the colour of the previously-unsunned paper, and that the first colouration of the paper takes place rapidly with the production of a succession of well-defined and easily distinguishable shades. But in proportion as the exposure is prolonged the visible action of the light diminishes, and a considerably longer time is required to perceptibly alter the tint of the silvered surface. The same rule holds good with the exposure of the gelatine tissue; hence, if we give a series of exposures increasing regularly by equal increments of time (or by arithmetical progression) we shall produce a scale in which the lighter gradations are well marked and distinct, while the portion which should represent the middle and deeper shades forms an almost uniform tint.

To obviate this difficulty it was proposed some years ago, by Mr. H. J. Burton, to substitute geometric for arithmetical progression in the actinometer scale, and theoretically the change seems to be quite desirable. But between the scales for use in connection with carbon printing and the more delicate instrument such as we require, there exists a wide difference in the applicability of the principle consequent upon the greater number of tints comprised in the latter. Thus we might construct a practically useful scale of five tints for printing purposes, the number of thicknesses of translucent material forming terms of the geometric series 1, 2, 4, 8, 16; but, if in constructing a scale as we have described by successively-increasing exposures to light we used the same rate of progression, the first term in the series being *one second*, the sixteenth tint would require an exposure of *over nine hours*. It is scarcely necessary to remark that no sensitive surface, so far known, is capable of successfully rendering such widely different exposures; but it is obviously open to us to apply the principle by reducing the rate of progression. Thus, if the first term of the series be thirty seconds, and the rate of progression 1·1, the sixteenth term will be (discarding fractions) two minutes five seconds, or a little more than four times the first.

The result of such a system of graduation will be found greatly dependent upon the sensitiveness as well as the density or thickness of the sensitive surface. Any variation in the sensitiveness will of course, with a given ratio of exposures, produce a different gradation of tints, and the same may be said of variations in the thickness of the gelatine. The best plan, but one requiring some care and calculation, appears to us to be the following:—Ascertain by experiment the minimum exposure necessary to produce a decided tint, and also the length of time requisite to give the desired opacity to the deepest end of the scale. Having thus found the limits of exposure, the interval may be roughly divided according to the number of tints into a series of logarithmic spaces—that is to say, gradually increasing the difference between the exposures of each succeeding pair of tints.

As an instance we may give the details of an actual experiment performed by ourselves in the early part of last autumn. Having exposed a strip of gelatine tissue for various periods, from a few seconds to half an hour, in bright sunshine, it was developed and subsequently treated with iron and pyro. in solutions of known strength and for a measured time. When dried it was found that the shortest exposure which had produced a distinct impression was twenty seconds, and when exposed in contact with a piece of silvered paper no change in the latter occurred under the tints exposed for eighteen minutes and upwards. We, therefore, took twenty seconds and seventeen minutes as the limits of exposure for the sixteen tints, and having found by calculation the necessary rate of progression we constructed a geometric series of exposures with twenty seconds as the first term. Rejecting, of course, fractional parts of a second, and, in the higher terms, slightly modifying the figures for convenience sake, the series runs as follows:—Twenty, twenty-six, thirty-four, forty-four, fifty-seven, &c., seconds—the intervals up to four minutes between the two last terms. We do not wish to convey the impression that it is necessary to be thus minutely particular, but merely to indicate the principle upon which we think a properly-graduated scale should be constructed. For all practical purposes it will, doubtless, be sufficient to observe the gradually-increasing difference between the tints, without entering into calculations.

Perhaps the most theoretically-perfect mode of securing a graduated scale is that proposed by Captain Abney, in which a plate is exposed upon a rapidly-revolving star cut out of blackened cardboard. The light passing through the converging apertures between the rays of the star produce upon the sensitive film a vignette effect, to which any degree of delicacy or "abruptness" may be given by modifying the shape of the star. The operation is, however, beset with practical difficulties of a mechanical nature which preclude its general adoption. We shall, however, describe a modification of the same principle with which we are at present experimenting, and which, though perhaps not as perfect in its results, is easier of application.

Briefly, it consists in the exposure of a plate by the rapid passage across its surface of a shutter, in which is cut a wedge-shaped opening; it is obvious that, however rapidly this may be effected, the portion of the plate which coincides with the base of the wedge will receive a proportionately longer exposure than the part which comes under its apex, and that by rendering the lines of the opening more or less convergent the difference between the two extremes may be increased or diminished at pleasure. The apparatus by which this is effected is extremely simple: a piece of three-quarter-inch deal, about fourteen inches by seven, has cut in its centre an aperture large enough to hold a quarter-plate, and a door carrying a spring is fitted to it as in an ordinary dark slide. Upon the front of this frame are glued two strips of wood which act as guides for the sliding shutter, which is of such dimensions that when pushed to either end of the frame it just covers the opening containing the plate. A broad slit is cut in the shutter and an adjustable slip of wood attached by means of thumb-screws, in order that any degree of convergency may be given to the opening; a stout elastic band stretched over two projecting screws causes the shutter to pass rapidly across the opening containing the plate.

We have not yet had sufficient experience with this apparatus to warrant us in saying much of its capabilities; but we have already met with difficulties in connection with the use of collodion films which will require to be surmounted before this form of scale can offer to compete with gelatine. We have as yet only experimented with dry films and alkaline development, and there appears to be a strong tendency to the destruction of delicacy in the half-tints in securing a sufficient amount of density. This is, perhaps, a matter which depends more upon the proper adjustment of the shutter than upon any defect in the mode of development; but after a few more trials we shall be able to decide upon the practicability or otherwise of the system.

FACILITIES IN COLLOTYPIC PRINTING.

Between the professional lithographic printer and the amateur collotypic printer there is a great difference. The former always has his ink and rollers in working order ready for use, whereas the latter cannot conduct an experiment, however trivial it may be, without entailing much preparation in this direction—preparations which, although involving the expenditure of time and trouble, yet count for nothing when, after the lapse of a few days or weeks, another experiment is about to be made.

It is this dread of encountering a great amount of trouble for the sake of obtaining a slight result that acts in a large degree in preventing amateurs from making themselves more familiar with collotypic printing than they are. The preservation of the inking rollers in a state of efficiency necessitates their being carefully washed and stored away after each experiment, while the charging of the inking slabs uniformly with thick, viscid printing ink forms the step preliminary to all others in conducting the operation of printing.

In the exceedingly interesting and instructive lecture on collotypic printing delivered before the Society of Arts on Monday, the 18th instant, Mr. Bolas alluded to the difficulty we have here raised, and to which he had given much attention. The remedy he proposed in the case of the printing rollers was to supply the place of those of leather and india-rubber by rollers formed of the ordinary glue and treacle compound—time honoured in this connection—"veneered," so to speak, with vulcanised india-rubber. The lecturer, being practical throughout, exhibited to the audience his method of constructing such a roller. This, as far as we can recollect, is as follows:—

A piece of wide rubber tubing several inches in diameter is placed inside of a brass tube of corresponding capacity, having a longitudinal slit from end to end to permit of its being forced open so as to admit the rubber tube with facility, which then adapts itself to the interior surface of the brass tube. A thick wooden rod having in its interior a thin brass tube is now inserted in the shell—of course placed in as central a situation as possible—and the space between is filled up with a mixture of glue and treacle, and when it has become cold the roller is finished. A roller of this kind is, in the estimation of Mr. Bolas, more easily retained in good working order than any other, while it also enables the finest results to be obtained. After being used it is sponged with turpentine, and then remains ready till it is next wanted. We are aware of india-rubber inking rollers having for several years been made use of for collotypic printing, but are uncertain whether they are formed in this particular manner.

With regard to the ink: instead of removing a portion of this thick, viscid substance to the inking slab and spending much time in spreading it uniformly—a condition absolutely requisite if uniform prints are desired—Mr. Bolas prefers placing a portion of the ink in a wide-mouthed bottle, and adding sufficient spirits of turpentine to dilute it. A piece of linen is now tied tightly over the mouth of the bottle, and a small portion of the contents is poured out upon the inking slab. Being thin, the ink is evenly distributed by means of a few strokes of the roller, a "photographic tone" being imparted by the admixture of a little iron violet, which is procured in tin tubes from the artists' colourmen.

These hints will probably prove as useful to our readers as the carrying of them into practical operation appeared to be to those who were assembled at the House of the Society of Arts on Monday evening last.

THE AMENDED DOUBLE TRANSFER PATENT.

We stated in a previous number that the Autotype Company had disclaimed a portion of the patent of Mr. J. R. Johnson under which double transfer in carbon printing, as practically carried out, is embraced. The "disclaimer" has now been published, and we are in a position to give details.

Speaking in general terms, the whole of those claims attached to what in the specification is designated respectively the "first," the "second," and the "third" improvement have been surrendered on account of some doubt having been expressed as to whether they are new; at any rate, these improvements, which have not been adopted in general practice, have not been retained. With this explanation we introduce the pith of the disclaimer, which is as follows:—

Now know ye that we, the said John Robert Mather Sawyer, Walter Strickland Bird, and Paul Frederick Bird, by and with the leave of Her Majesty's Solicitor General, do hereby, for the reasons aforesaid, and for effecting the objects aforesaid, insert after the word "in" in the eleventh line of the seventh page of the print c the said specification printed by the Queen's printers, and published at the Great Seal Patent Office, the words "some of." And we strike out of the said specification the whole of the passage commencing with the words "1. Now my first improvement," in the seventh line of the eighth page of the same specification, and ending with the words "behind them" in the thirtieth line of the tenth page thereof; and we also strike out from the thirty-first line of the same tenth page the figure and words "4. My fourth improvement consists," and we insert in lieu thereof the figure and words "1. My first improvement consists;" and we strike out from the thirty-seventh line of the same tenth page of the said specification the words "and the tissue be well exposed;" and we strike out from the said specification the whole of the passage commencing with the words "even if" in the seventeenth line of the eleventh page thereof, and ending with the words "impure surface" in the eighteenth line of the same page; and we strike out from the said specification the whole of the passage beginning with the words "or the resinous cement" in the fourteenth line of the twelfth page thereof, and ending with the word "together" in the seventeenth line of the same page; and we strike out from the thirty-fourth and thirty-fifth lines of the same page the words "under this fourth head of my improvements," and insert in lieu thereof the words "under this first head of my improvements;" and we strike out the word "permanent" in the last line of the said twelfth page, and we insert in the said last line of the same page the words "herein referred to" after the word "support;" and we strike out from the eighth line of the thirteenth page of the said specification the figure and words "5. My fifth improvement consists," and insert in lieu thereof the figure and words "2. My second improvement consists."

And in order that it may be clearly understood what is the invention which we now consider to be secured by the hereinbefore in part recited letters patent, we shall proceed to repeat (omitting preamble and testing clause) the said specification as proposed to be amended by this present disclaimer and memorandum of alteration, as follows:—

Now know ye, that I, the said John Robert Johnson, do hereby declare the nature of my said invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof, that is to say:—

My first improvement consists of a new mode of obtaining photographic images in pigmented gelatine or its analogue upon plates of metal, glass, or other substance impermeable to water, which plates may be used either as permanent or temporary supports, dispensing in the latter case with the india-rubber paper heretofore used for this purpose.

This improvement is based upon the observation that, if the support be impermeable to water, no cementing material is necessary to effect the adhesion necessary for mounting the tissue upon its support, all that is necessary being the perfect exclusion of air between the moistened surface of the tissue impressed by light and the impermeable surface to receive the picture as its support. I effect this by wetting the tissue and laying it upon the metal or other surface, and sponging or rubbing the back of the printed tissue so as to drive out air with the superfluous moisture, as in mounting a print upon card.

To effect perfect and permanent adhesion, the surface of the glass or metal forming the support must be chemically clean, particularly when such surface is polished. To avoid the necessity of thus cleaning the surface I occasionally cover the surface with a very thin layer of plain collodion, using for this purpose a collodion containing about one or two grains of cotton to the ounce of ether and alcohol forming the solvent. When the collodion is set, but not dry, I plunge it into water to wash off the solvents until the greasy appearance has ceased; I then lay upon the plate thus prepared the wetted tissue. When the picture is completed it adheres to the glass with great tenacity by surface adhesion only. Pictures thus mounted upon glass or metal as their permanent support may not only be used as pleasing pictures, but can be employed in various processes as a model or pattern to obtain casts or impressions, either by means of pressure, by the electrotype process, or by casting.

The hardened gelatine picture, either negative or positive, on a plate of zinc, copper, or steel, may be also used as a resist, which enables us to etch the plate or to gild it for the purpose of etching it, subsequently, with the object of producing a plate in intaglio or relief for the purpose of printing therefrom. When the plates of metal, glass, or other impermeable substance are used as temporary supports, such plates must have received some slight smear or coating of wax or other fatty body to prevent the absolute adhesion of the picture film. Instead of wax alone, I find equal parts of wax and yellow resin dissolved in turpentine to give the best smearing compound. This is rubbed over the plate and immediately rubbed off again with a piece of clean flannel, leaving only a very thin coating.

When polished glass plates are used as the support instead of the wax and resin, I prefer to use a coating of the thin collodion already described to prevent the adhesion; but in this case the collodion coating must be allowed to dry before immersion in water. The film so formed then readily leaves the glass attached to the print, which retains the polish of the temporary support. Plates thus prepared allow of pigment gelatine images being formed on their surface, not only by development in the way described, but indirectly, by employing the image formed by development, and as a model or pattern for obtaining a mould from which other and similar gelatine images are obtained by casting, and images thus formed may equally be transferred to paper in the way described. The nature of the surface of the support will determine the resulting surface of the gelatine image.

A polished surface will give a polished surface to the print. If a mat or grain surface be required, the support must be grained or tooled to give that surface.

The gelatine image may be transferred to paper while in the wet state by bringing into contact with it a piece of paper coated with gelatine or other analogous substance, or, which is preferable, the image may be allowed to dry upon its support, and the prepared paper soaked in water may be laid upon it, air being carefully excluded. I also transfer the print from its temporary support to a sheet of imitation ivory, as in the so-called eburneum process, or to a sheet of imitation porcelain or marble formed of plaster or other plastic substance.

When the print is required to be mounted upon a fabric I take fine muslin or other porous fabric, and after wetting it I lay it over the print upon its temporary support, and I spread over the muslin or fabric any of the before-mentioned cements mixed with whiting or other pigment. This compound penetrates to the surface of the print, thoroughly expelling air, and when dry perfect contact is effected. The muslin or fabric can then be lined with canvas, as is well understood.

If the picture be very large, and be formed of several negatives, I mount the several parts upon paper or other flexible support, either coated with india-rubber, as already practised, or as above described. I cut out the several parts, wet them, and lay them down well matched upon a drawing-board, and I then proceed to mount them upon, or rather under, the muslin or fabric as already said.

I claim as my invention under this first head of my improvement:—

First. The formation of the mounting of the gelatine image formed, as described, upon a sheet of glass, metal, or other impermeable surface serving as the support herein referred to, without the intervention of any cementing material, to be used as pictures or as models, moulds for producing engraved plates, or otherwise.

Second. The mode of transferring images of gelatine mounted upon the surface of plates of glass or metal from such surface (serving as a temporary support) to the surface of paper or the like material, by means of an intervening film of wax or other substance having the like properties.

2. My second improvement consists in another mode of transferring the picture in one or many parts from its temporary to its permanent support for the purpose of being painted upon in oil or being varnished. I mount the picture in this case upon paper rendered transparent by wax, paraffine, or any fatty matters not fusible at the temperature used for developing the gelatine pigment prints. When the developed print is quite dry I varnish the surface of the permanent support which is to receive it, such as wood panel or oil canvas. I varnish also the face of the picture, and if of several parts I carefully match these. The two varnished surfaces, when nearly dry, are then rubbed down together, and when in perfect contact the back of the waxed paper is warmed, and then leaves the pigment film perfectly attached to the panel or canvas. Before the picture is transferred it may be tinted or painted, and if painted with opaque colour it may be laid over another picture without the latter being seen. Thus I form composition pictures by laying down a landscape background, for example, upon the canvas, and upon it I place figures trimmed to their contours, and which have received a coating of white or coloured opaque varnish at the back. These then show as perfect forms without the landscape or other background interfering, and as the gelatine film is extremely thin the superposition is not visible.

From the foregoing amended specification will be perceived the precise nature of the patent under which carbon printing by double transfer now takes rank. This patent, we may observe, remains in force till 1883, or for about five years from the present time.

We have some little doubt as to the advisability, at the present time, of introducing another new developer to compete with ferrous oxalate; but as there may, doubtless, be some with whom the latter will not find favour, and as our introduction is only a modification of alkaline pyro., we have decided to give it for what it is worth. It consists of the substitution of a compound of gelatine and potash for the ammonia usually employed in connection with pyro., and we have found it to combine in a remarkable degree the qualities of energy and regularity of action. The solution is prepared by dissolving gelatine in solution of potash and boiling for a few minutes, and, after the liquid has cooled and become clear, it is decanted and used in the same manner as the dilute ammonia. We are scarcely in a position to state the *best* proportions of the ingredients, but the following has answered well in our hands:—Caustic potash, half an ounce; Nelson's opaque gelatine, half an ounce; water, five ounces. Dissolve the potash, and then add the gelatine and boil until dissolved, stirring during the operation. The cold solution, when clarified, may be used in the same proportions as the solution of ammonia (one to seven), and works rapidly, producing very vigorous images; but the quantity may be increased, when necessary, to a much greater extent than is permissible with ammonia, owing to the potash exercising no solvent action upon the developed image. The presence of the gelatine acts as a restrainer upon the otherwise too powerful potash. If the same mixture be boiled gently in a narrow-necked flask for three or four hours it acquires an acid reaction, and when set aside for a few days it deposits a granular crystalline precipitate, together with a pasty substance similar in character to unaltered gelatine. If the thin, supernatant liquid be poured off and the residue treated with alcohol the crystalline matter is dissolved, and the solution forms a most useful addition to emulsions for the purpose of conferring density. It is probably a mixture of several of the decomposition products of gelatine. It is acid in reaction, and gives a white, milky appearance with solution of nitrate of silver.

It will be remembered that in our report of the last meeting of the South London Photographic Society we stated that Mr. C. Bennett had exhibited, among other negatives, one of an interior of a room taken at night by gaslight on a dry gelatino-bromide plate. This negative, with a transparency printed from it, together with some other negatives by the same gentleman and process, are now in our office on exhibition, and they have elicited expressions of the most lively interest from several experts in the gelatine process to whom we have shown them. The circumstances under which they have been taken will be ascertained from the following extract from a letter from Mr. Bennett:—

"I think it may interest many of those amateurs who work gelatino-emulsions to know that it is quite possible to photograph interiors of rooms, &c., by gas or paraffine light without the aid of any other illumination. I send you, therefore, a stereoscopic negative of a room to show what can be done in that direction. The light consisted of two candles, one gas chandelier fully lighted, two duplex paraffine lamps, and one single ditto. By experiment I found the two duplex lamps to be more effective than the others combined. One lamp was placed on each side of the camera, a foot from the floor, to illumine the carpet and articles near the camera, and one lamp was on the supper table. On viewing the transparency through a stereoscope the difference of the aspect of this lamp fully burning and the moderator lamp, which was not lighted, is very curious. The candles have burnt down during exposure an inch or so, consequently their flames appear (in the negative especially) ridiculously long. The lenses were Dallmeyer's six-inch focus single meniscus—time of exposure one hour. With gelatine emulsion as usually made, and with ordinary development, I think the light would have to be increased, or compound lenses used; but should you think it will interest your readers I would give further particulars, which would enable them to work with the same power of lens, in the same time, and with the same light. I also send you two other ordinary gelatine negatives of the same class of emulsion as I now speak of."

One of the negatives here alluded to is an instantaneous view of a boat scene on the river, and it bears the label—"Exposure by drop shutter—say twentieth of a second—by Dallmeyer's 10 × 8 group triplet." Another is also a river scene—exposure four seconds—by Ross' seven-inch slow symmetrical. On behalf of our readers we request Mr. Bennett to kindly send full particulars of the method by which he has obtained such excellent results.

ON NEW DEVELOPERS.

Towards the end of last spring I sent to The British Journal of Photography an account of some observations which I had made on new developers and new modes of development. The number of facts to be stated was so large that much brevity was necessary to prevent the communication from extending to an excessive length, and much had to be omitted. I therefore add here a few remarks which I thought to have sent before.

And, first, it may be worth while to advert again to the necessity of clearly distinguishing between those modes of development in which the image is built up by additions to the film and those in which it is formed at the expense of the film itself. Generally these have been distinguished as the wet and dry developments, or as the acid and alkaline. This method of classifying is completely erroneous, as follows from the facts rapidly stated in the above-mentioned paper. It happened that the one method (that of additions to the film) was generally used with wet plates, and the other (decomposition of the film) with dry—the one by means of an acid, the other with alkaline development. This concurrence was, however, fortuitous. For example: a film containing no soluble silver salt (and therefore producing an image by decomposition of the film) can be developed in a very acid solution of ferrous oxalate. This gives rise to a very curious experiment. If a well-washed and dried film be thrown after exposure into a solution of ferrous sulphate absolutely nothing will appear; but the simple addition of a solution of oxalic acid will cause the image to appear. Here is a developer that has only become one by the addition of a powerful acid!

After I had proved, many years ago, that in bromide dry plates the image was produced by a decomposition of the bromide in the film, it was the general belief that this capacity was one belonging exclusively to silver bromide, and indeed it seems difficult even now to have this error corrected. About two years since I showed that silver iodide could be emulsified with entire facility, and would yield an image by alkaline development; and, if I am not mistaken, the late Mr. Sutton proved the same with respect to silver chloride. Silver iodide exhibits a very considerable degree of sensitiveness to alkaline development, though less than bromide, and both less than the two taken together.

A solution of cuprous oxide in ammonia is a powerful developer. It is a curious and interesting fact that the two oxides, ferrous and cuprous, are capable of forming powerful developers, with this essential difference—that the one must be in acid or neutral, the other in alkaline, solutions; though, with respect to cuprous oxide, this must be stated with some reservation. As yet I have only found alkaline solutions of cuprous oxide active; but with ferrous oxide it may certainly be stated that the solution must *not* be alkaline.

For example: if to a solution of ferrous sulphate we add an alkaline carbonate there is, of course, a precipitation; but this may be prevented by the addition of cane sugar to the iron solution before the alkali is added. We have then a strongly-alkaline ferrous solution, and sugar has no tendency to prevent development. *A priori*, we should expect such a solution to combine the advantage of the ferrous wet developer and of an alkaline developer for dry plates; whereas on a washed film it does not bring out the vestige of an image—at least with exposures that respond instantly to other modes of development.

The powerful reducing properties of *stannous salts* seemed to indicate that they ought to afford good developers. Some years ago I tried them without success. Last spring I repeated these trials and varied them, but with no better results. Ordinary stannous chloride could, of course, not be expected to give results, but even compounds of stannous oxide with organic acids did no better. Hopes were entertained that stannous oxalate dissolved in potassic oxalate would give interesting results, but it did not give a trace of an image; nor did lactate. Besides stannous salts of organic acids the sulphate was tried, but without effect. Stannous oxide dissolves freely in solutions of potash. This solution acted quite differently from the previously-mentioned tin compounds. Whilst they had no effect this solution of potassic stannite instantly blackened the whole film.

Amongst many interesting results perhaps the most valuable was the discovery of the developing powers of ferrous oxalate. Its development is singularly beautiful—I think the most so of all that I am acquainted with. Within the last few days I have gone over my specimens, and have been greatly struck with the beauty of those obtained with ferrous oxalate.

In all photographic negative processes it has always seemed to me a great object to be able to shorten the exposure as much as possible. The exposure must always be a full one, but "full" is a relative term. It is desirable to obtain modes of operation for which a very short exposure will be a full exposure. Still days are always exceptions, and with every additional minute of exposure to a landscape the danger of motion to foliage increases. And what vast numbers of otherwise exquisite negatives have been ruined by blurred leaves! No one would now, I suppose, employ the older dry process for which half-an-hour's exposure was found none too much; for, even when so wonderful a thing is found as a day when foliage remains quiet for half-an-hour together, it is not desirable to expend that half-hour in obtaining a single exposure.

There are two quite distinct modes of shortening exposures—by heightening the sensibility of the plate, and by increasing the power of the development. Of the two directions in which we may search for improvement, whilst both are valuable the latter seems to have some advantages. Increased sensitiveness of the film, excellent as it is, is often accompanied by inferior keeping properties, by greater tendency to stain, and by greater difficulty in obtaining printing density. But increased power in the developers is, or may be, free from counterbalancing disadvantages.

For this reason I am inclined to think that the ferrous oxalate developer will prove valuable. It brings out an image with materially less exposure, and this result is not obtained at the expense of detail or accompanied by a tendency to fog. On the contrary, when in my experiment of last spring I compared it with development by alkaline pyrogallol, I found that in cases where the alkaline treatment yielded only poor, slate-coloured images, with a tendency to fog on pushing, the ferrous oxalate gave clear, bright images with a singular absence of fogging. These oxalate images have often a beautiful metallic appearance resembling red gold, which is quite peculiar to them. They seem also to be of singularly fine texture.

Very strong solutions of this developing liquid (solution of ferrous oxalate in potassic oxalate), if set aside for a long time—a year or so—will sometimes deposit a crop of green crystals. This separation of green crystals from a deep red liquid seems curious. The crystals are, however, not the developing substance, but consist of ferrico-potassic oxalate. The last-named substance is formed by oxidation, through the gradual penetration of air through the cork of the vial, and, though very soluble in water, seems rather insoluble in solution of ferroso-potassic oxalate, the developing solution.

There is another curious remark. Ferrous salts are mostly green; ferric yellow or red. In the case of the double oxalates of iron this characteristic is exactly reversed, the ferrous salt being yellowish red; the ferric salt green.

M. Carey Lea.

P.S.—I notice in a recent number of The British Journal of Photography mention made of Mr. Willis in connection with the ferrous oxalate developer. I cannot suppose that it would be intended to attribute to him a discovery which I made a year ago, and published in your columns about nine months before him.—M. C. L.—[Certainly not: our invariable rule is to give the credit of discovery to the first to *publish* such discovery—in this instance our esteemed contributor, Mr. M. Carey Lea.—Eds.]

ON THE FADING OF CARBON PRINTS, AND THE SUPPRESSION OF BICHROMATES IN CARBON PRINTING.

[A communication to the Photographic Society of Great Britain.]

Many photographers have already noticed the alteration which takes place when carbon prints have been exposed for a few weeks to the influence of the solar rays. These prints lose their beautiful colour, and become yellowish or of a dingy green. This fact has been attributed by everybody to the employment of fugitive or unstable colouring matter—such as cochineal, for instance—in the manufacture of carbon tissue. But as will be shown by this *memoir*, there is another cause in addition to the preceding.

It is generally admitted that light, in acting upon bichromate of potash in combination with organic matter—such as gelatine—reduces this salt to the state of sesquioxide of chromium, which locally renders the organic matter insoluble. Warm water will wash away that which remains unaltered. I should not be inclined to argue against this *theory*, if it were not that the *facts* are so contrary, as the following experiments will prove:—A sheet of paper is immersed in bichromate of potash and dried. It is then exposed for an hour to daylight; next washed for an entire hour in boiling water, to be afterwards immersed in an alum solution for several hours; afterwards washed in cold water, and finally hung up to dry.

According to the before-mentioned theory this paper should contain nothing more than a salt of sesquioxide of chromium, absolutely unalterable by the action of light. But this paper is *yellow*, while the salts of sesquioxide of chrome are *green*. But, moreover, if this paper be exposed to light, a part being covered by a mask of black paper, it undergoes an alteration in the course of a few weeks, and a sharp, distinct impression of the mask is brought to view. Now, where the light has acted the paper is *green*, like the salts of sesquioxide of chromium.

This experiment, and many others which we have made in this direction, prove, to our thinking, that neither hot water nor alum *fix* carbon prints. It is true the excess of bichromate is removed by these means; but the chromic salt which has rendered the gelatine insoluble not only *remains*, but this salt itself *undergoes a change by exposure to daylight*. And while thus deoxidising, it accelerates the action of light upon the organic colours which constitute the image, and so these colours fade much more rapidly than they would otherwise.

Naturally I have endeavoured to find a fixing agent, and have succeeded. Thus, in the case of the paper immersed in bichromate, exposed to light, and washed in boiling water, if instead of alum it is immersed in *bisulphite of soda*, it will, when dry, be absolutely unalterable by any subsequent exposure to light. Knowing these facts, and with the object of rendering carbon prints unalterable, I have directed my attention to the mineral and organic colouring matters which are reputed to be unfading—such as indigo, madder, the oxides of iron, &c.

Indigo (purified by a preliminary dissolution in fuming sulphuric acid, &c.) is a blue colour reputed permanent, and useful for the manufacture of tissue of a purple tone. Experiment, however, has proved to me that in carbon tissue it changes its colour by the influence of light. It will, therefore, be best to abandon the purple tone, for, with the exception of indigo, there does not exist any solid or permanent blue colour. And now as to madder. It is known that the roots of madder, boiled in an alkaline solution, give up their colouring principle, and that alum added to the above alkaline solution precipitates the colouring matter, forming an aluminate. This product is known as *madder lake*.

Mr. J. W. Swan, in a private letter dated 1875, called my attention to purpurine—a substance which I studied at this period, as well as alizarine. These two products constitute the colouring principle of madder. Here is the method which I have made use of, and which gives a very good lake:—Sixty grammes of alizarine are dissolved in three litres of boiling water, to which has been added 180 cubic centimetres of ammonia, of a density of 0·910. The whole is then well shaken and filtered boiling. Another boiling solution, consisting of 300 grammes of alum, dissolved in seven litres of ordinary water, is then poured into it at one dash, without stopping. The mixture is left for twenty-four hours to settle, and then filtered. The filtered liquid ought to be colourless, and not rendered turbid by the addition of a weak solution of carbonate of soda, which would denote an excess of alum. The precipitate is pressed, mixed intimately with glycerine, and ground up.

If this method be exactly followed, the aluminate of alizarine thus prepared will not stain single transfer paper, because it no longer contains alizarine, and will not render the film of gelatine subsequently insoluble, because it does not contain an excess of alum. I place, however, at the disposal of the Society the alizarine employed, and the lake madder prepared according to this method. This lake madder has been for some years commercially obtainable.

Instead of ordinary alum, use can also be made of *iron alum*, or of a salt of peroxide of iron. The precipitate obtained would appear, on a cursory glance, to be black; but it is of a very beautiful red—provided an excess of iron has not been employed. I have employed this lake for certain colours for a considerable time past. The lakes of madder, or compounds of alizarine, have the reputation of not fading under the influence of light, because in dyeing and painting they have been used for many years. However, these colours employed in carbon tissue *are* alterable by light, and it suffices to expose a print to the sun under a band of black paper during ten days or a fortnight to discern very plainly the part which has been protected by the mask.

And now I place in the hands of the members present the proofs of what I have stated, and every one will be able to make a similar trial. Pictures exposed in October last are today completely changed in colour, having become yellow like the old silver prints. (This can be seen better in daylight than in the evening.)

That which specially proves that the action of the light is aided by the chromic salt is that, if the colour be spread by itself upon paper, it resists infinitely better, although if laid on thinly it does alter. When we say that indigo and madder do not fade under the influence of light it is true only in wool, silk, and cotton fabrics, which are stained through a considerable thickness of material; but it is not true when the same colours are spread out in thin films precisely as we find them made use of in carbon tissue or carbon prints.

And now let us proceed to the consideration of the metallic oxides. Students of mineralogy are well aware that among the oxides of iron are some of a superb and varied red. But painters know also that these oxides, ground up with oil or water, give dull and muddy tones. Now, for photography, it is necessary that the colours used shall be *transparent*, because it is the various thicknesses of the coloured film which form the half-tones.

A chance experiment led me to the discovery that, if the oxides of iron lack transparency, it is due solely to a physical cause, namely, that they are too hard to be reduced mechanically to their finest state of division. As a proof, if strong solutions of perchloride of iron and of soda, *thickened by sugar*, are mixed, peroxide of iron will be formed in a spongy and finely-divided state. Dry one-half of the product. It gives, after grinding up with the gelatine, an opaque film upon glass. Now let us make use of the other half gathered moist, upon a filter, mixed with glycerine and gelatine, and we shall obtain a transparent film upon glass, because the colouring matter is actually dissolved.

By varying the temperature pressure, and other purely physical conditions, we can obtain from oxides of iron and of certain other metals red or brown colours very beautiful to the eye, and absolutely and infallibly unalterable by exposure to light.

These, then, are the colours which I now use, which I shall continue to use henceforth, and the adoption of which I recommend strongly to all manufacturers of carbon tissue. I could easily have taken out a patent for these colours; but it is my opinion that patents are the best-contrived means for retarding the general adoption of the carbon process.

I possess prints (and I shall be happy to place them at the disposal of any persons who may ask me for them, in order that my statements may be verified) which have been exposed to the sun for about eight months, and which have undergone no change whatever. No organic matter—cochineal, madder, or indigo—could withstand a similar trial.

In conclusion: I shall lay before you the experiments I have made with a view to do away with the use of bichromate of potash in the carbon process. A piece of ordinary carbon tissue is immersed in an aqueous solution (twenty per cent.) of citrate of iron and ammonia, dried (in the dark), exposed behind a negative, wetted and transferred to glass—the usual operations. On developing with warm water NO TRACE OF AN IMAGE IS VISIBLE! But if after exposure to light the carbon tissue, instead of being wetted in ordinary water, is put into a solution of bichromate of potash, and be then immediately transferred to glass and developed with warm water, the action of the light upon the iron salt is transmitted to the bichromate of potash, and a picture appears. Instead of wetting the print in bichromate of potash before transfer, use may be made of bichloride of mercury and some other substances which I shall point out on a future occasion. If tannin be employed the action of light is reversed, and a negative is obtained.

Instead of the ferric salts I can also make use (with some modifications) of the stannic and other metallic salts, the bases of which have several degrees of oxidation; but the detail of these experiments would occupy too much time. Let it suffice to say that the greatest difficulty I have had to conquer has been the preservation of the half-tones.

I shall continue to prosecute my researches in this direction, and I hope soon to be able to submit to the notice of the Society a new carbon process, wherein the bichromate will be suppressed, and double transfer for the *redressement* of the pictures rendered unnecessary.

In bringing these facts before the public, my great object has been to cause others to make still further researches, and I shall be most happy if they lead to practical results—whether myself or others find them out. D. VAN MONCKHOVEN.

STEREOSCOPIC TRANSPARENCY PRINTING.

MR. BREESE'S METHOD.—No. I.

THOSE who are acquainted with the best of Mr. Breese's stereographs will probably expect to read something novel in an account of his process, and will, doubtless, be surprised when they find the formulæ he employed, and by which he produced so great a variety of effects, were very common, having been repeatedly published a few years ago. To many photographers the subject I am about to treat of will, to a certain extent, be a new theme; so perhaps it will be as well to begin at the beginning, then. If there be a fault, it will be rather that of saying too much than too little. I propose to deal first with the formulæ, apparatus, and accessories, and to follow these with some remarks on manipulation, which I shall endeavour to make clear by describing various kinds of effects and how obtained.

The first thing requiring consideration is the *Glass*. This should be of the French kind, which is nearly colourless and very thin. It can be procured, both plain and ground, through Messrs. Marion and Company or through a commission agent in France. Great care must be taken to store it in a dry room, or something like a decomposition takes place, which so softens the surface as to make the glass utterly unfit for the purpose. It is best cleaned with a mixture of carefully-prepared tripoli or rouge in spirits of wine, followed by the application with a tuft of cotton of a little old collodion to which a little water has been added, the final polish to the surface being given by the removal of this with an old silk handkerchief. Substratums must not be resorted to; the operations and results are too delicate for anything of that kind to be successful.

The *Collodion* most suitable for general use is a ripe sample, simply iodised, such as was formerly supplied by the first-class makers for the old-fashioned pyrogallic development, that made by Mr. Thomas being especially good. For special classes of work one or two kinds are necessary; but more about these when I come to the circumstances requiring them.

The preparation of the *Nitrate Bath* is as follows:—Dissolve three ounces of pure triple-crystallised nitrate of silver in twelve ounces of distilled water; iodise this by the addition of two and a-half grains of iodide of potassium previously dissolved in a drachm of water. After thoroughly shaking, pour this strong solution into the remaining twenty-four and a-half ounces of water necessary to reduce it to a strength of thirty-five grains per ounce, filter twice or thrice through some filter paper, test for free nitric acid, which, if present, carefully neutralise with oxide of silver, filter again, and acidify with from eight to ten minims of glacial acetic acid. The latter should be of the utmost purity, otherwise it will prove a source of much trouble. When great richness of tone is desired the formation of acetate of silver by the addition to this bath of two or three grains of acetate of soda dissolved in water will be found to contribute towards its production. A caution respecting the use of this bath, especially with the last modification, is necessary to those photographers whose experience has been wholly confined to the use of nitric acid for acidifying. It is exceedingly sensitive to dust and dirt; many kinds of spots, streaks, and comets make their appearance, which one does not see when using the hardier bath commonly in use at the present time. Care in preparation and cleanliness in manipulation will, however, be amply repaid by the absence of these defects and the delicate beauty of the results in other respects.

The *Developer* for all purposes of printing is composed of—

English pyrogallic acid	12 grains.
Glacial acetic acid	½ ounce.
Water	4 ounces.

The bottle containing it should be labelled "strong." An ounce or so of this is poured into another bottle, labelled "weak," and is diluted with one and a-half or twice its amount of water. In cold weather the amount of acetic acid may be reduced to two-thirds the quantity given above.

The *Fixing Solution* should be of cyanide of potassium, about seven grains per ounce in strength. Also have in readiness on the same shelf with this a ten-grain tincture of iodine for use in the production of atmospheric effect; biting out those portions of clouds obtruding themselves in the wrong place; or for purifying the reflection of the moon from the sea, by reducing intensity or removing entirely the monotone of the moon glass in those portions which come immediately behind the part reflecting when this has not been stopped back in the printing.

The *Toning* of the slides is accomplished by one of the following solutions, according to the requirements of the subject:—A one-grain-per-ounce of the developer as given above, a very weak solution of bichloride of mercury, and a solution of chloride of gold one grain to eight ounces of water. Many others have been tried, but were ultimately abandoned because of the fugitive nature of the effects produced. The only doubtful one retained is the bichloride of mercury. This, by the use of a weak solution followed by copious washing, does not occasion much cause for complaint. Its beautiful blue tone in moonlight effects cannot be surpassed.

The *Varnishes* required are of two kinds, namely, a transparent one for the front glass or glasses of the transparency, and a ground-glass substitute for the back one. Amber varnish, composed of gum amber dissolved in methylated chloroform, is most suitable for use in the first case, being very free from structure. A few grains of white wax dissolved in this (as I have before stated) deadens the surface considerably finer than the finest French ground glass, and for the back one answers the purpose very much better.

Such are the formulæ. Very antiquated some, perhaps, will say—almost like reading a page of the early history of photography;

but, nevertheless, I think I may venture the assertion, after extensive observation, that the results produced by them have never been approached. Difficulties must be expected, for much depends on manipulatory skill. There are none, however, that will not be overcome by a little painstaking, thought, and practice.

A few accessories are necessary in printing, which perform the duties of, and are much of the same character as, vignetting glasses. These were termed "masks" or "shades." In combining clouds, having a chimney-pot or other foreground with a sea view, there would of course be a necessity for a delicate softening off of the clouds from the pots upwards, and likewise with the sea view from its horizontal line into the sky, an even tint resulting when the two softened edges are superposed. For each of the above negatives a mask would be required opaque at one edge, this opacity being gradually reduced to transparency at the centre of the glass. The best known method for obtaining one of these masks, perfectly graduated as specified above, is to procure a sheet of white blotting-paper or cardboard and roll about half of it into a good-sized cylinder, under the edge of which place a sheet of yellow tissue or other paper, and spread it out upon that part of the paper unrolled. When this contrivance has been fastened with clips or pins, and placed facing a high side or other suitable light, with its flat yellow surface upwards and in a horizontal position, it will be observable that the yellow reflected on the lower portion of the cylinder merges by imperceptible degrees into that of the upper of white. If a photograph of this be taken out of focus, with the twin lenses of the binocular camera so placed that the centre of the roll may occupy the centre of the plate and fill it in length, it will, if condition of light were right, be all one can desire. Masks for printing coloured glasses from can be made by placing two of the above face to face, with their opaque sides to the opposite edges, the centre being left quite transparent. These can be again copied for one opaque in the centre.

When the landscape is of very irregular outline a piece of blackened cardboard is necessary, upon which temporarily fasten a rough paper print of the landscape, and cut out the cardboard to the outline. During the exposure of the cloud selected for the picture use the shape to screen the light from those portions not required, taking care to move it sufficiently up and down to prevent hardness. With the help of a mask already adjusted on the negative nothing need be allowed to print hurtful to the finished effect. This is what I designated in a former communication as "wafting."

Another kind of mask is one used for printing circular halos. For this a piece of cardboard a foot or so square should have painted in black upon its centre a good-sized six- or eight-pointed star. The points should be wedge-shaped and of considerable length. The longer and finer these are the greater will be the softness produced. A pin having been driven through the centre of this drawing to spin it upon, it is ready to be photographed out of focus and while spinning at a quick rate. The several uses of these masks will, I hope, receive attention further on. JOHN HARMER.

ON THE ELIMINATION OF THE CAUSES OF FOG FROM EMULSIONS.

IN papers that have been read before the Photographic Society it has been shown by what means fog on plates can be removed; but they were not, perhaps, sufficiently explicit on the removal of the cause of fog from the emulsions themselves. It is, therefore, proposed to treat of this question. In an emulsion, whether washed or unwashed, the chief basis of sensitiveness is bromide of silver, and if this can be obtained in a pure state, experiment has shown that there is no inclination to fog. In preparing bromide emulsion, however, we have causes at work which prevent the formation of the pure bromide, unless one of two conditions are fulfilled—either, first, there must be an excess of soluble haloid; or, second, something must be added in the shape of acid to the mixture if silver nitrate is to be in excess.

It must be premised, however, that anything that will act as a nucleus on which the metallic silver, produced during the action of development, can deposit will cause fog. This quantity may be very minute, as can readily be understood when the small quantity of the haloid salt, reduced to the sub-haloid state by the impact of light during a short exposure, is considered. Let anyone who doubts the fact try adding a small quantity of silver oxide to a neutral emulsion which is working brightly, and note the result in developing a plate prepared with it.

We will treat of the first case; the reason of this method giving freedom from fog is very simply explained. In the soluble bromides—and it may be sometimes in the silver nitrate—we *always* have impurities, no matter how carefully the preparations may have been made, and even if they have been originally what they profess to be, yet afterwards by contact with the air they become contaminated. The impurities may be, and often are, so small that they cannot be traced by ordinary chemical means; but light is able to detect them for us. In some recent experiments we have carried out we have found that silver bromide is formed before any other silver compound except the iodide, when the sensitive salt is formed from haloid salts, and not the halogens themselves. Thus, if potassium bromide be contaminated with potash (as is sometimes the case in appreciable quantities), and if silver nitrate be added, we shall have both silver bromide and silver oxide formed if an excess of silver nitrate be added; but if there be a defect of this salt there will not be a trace of silver oxide, but only silver bromide. Again: if we take bromide of copper, which is usually contaminated with the sub-bromide, it will be found that the bromide is all utilised before the sub-bromide is attacked at all; and if in addition to the bromide we have a metallic chloride present which may be contaminated with sub-chloride, the order in which they will combine with the silver nitrate is:—Bromide, chloride, sub-bromide, sub-chloride. Thus, if there be only sufficient silver nitrate added to an emulsion to combine with the two first on the list, the other two will be left in the emulsion as harmless compounds. The *rationale* of the elimination of fog from the furnished emulsion in which there is *at first* an excess of silver nitrate is thus demonstrated. Supposing we have an emulsion which contains bromide, sub-bromide (which can exist, as shown in a paper *On Intensifying Negatives with Copper Bromide*) and oxide of copper, and also a slight excess of silver nitrate. The addition of certain metallic chlorides or of hydrochloric acid will at once convert the sub-bromide and oxide into the chloride of silver, leaving harmless compounds behind. The metallic chlorides which are of use are those which readily part with chlorine, and which, therefore, preferably form more than one chloride, such as copper, cobalt, gold, platinum, &c. When other chlorides, such as of the alkalies, are employed, the needful substitution may not take place, because the affinity of the alkali for the chlorine is greater than for the sub-bromide, and therefore the elimination of the sub-bromide is not effected. Thus, supposing all the silver nitrate in original excess is converted into silver chloride, we have the silver sub-bromide to get rid of. Thus, supposing we are using sodium chloride as a corrective, then we should have—

$$Ag_2\ Br + NaCl,$$

which can form no new compound, since an atom of metallic silver or sodium cannot be left in a free state; but if we use (say) cobalt chloride, we have—

$$Ag_2\ Br + Co.Cl_2,\ \text{which can form—}$$
$$Ag\ Br + AgCl + CoCl.$$

The CoCl, or sub-chloride of cobalt, is harmless, and can be washed out of the film.

It will, therefore, be seen how it is that an excess of haloid salt gives freedom from fog.

Secondly. If an excess of silver nitrate be used, it is evident that something else besides a mere chloride will be required, since the sub-salts and oxides may be formed. This we find in the employment of an acid or halogen itself, or both together, added to the collodion, and to be most rapidly effective. This should be added to the soluble salts before the silver nitrate is added.

Suppose nitric acid alone be employed, then any oxide or carbonate will immediately be attacked, as also any of the sub-bromides—such as of copper. Again: if *aqua regia* be employed, we know that chlorine is evolved in an extremely nascent state, and that this would attack either oxide or sub-bromide, fully saturating the unsatisfied atom in the latter. If, now, silver nitrate be added, silver bromide and chloride would result with some compounds (perhaps such as the chlorate) which would be as inert as the silver nitrate itself.

If a halogen be employed without any acid the same result would occur. Thus, suppose we had as impurities an oxide and a sub-bromide, and that we added a solution of bromine to it, we should get the oxide changed to a bromide and bromate (the latter salt of which is experimentally proved to be inert), and sub-bromide changed to a bromide.

If the halogen be added last, when there is an excess of silver, it is probable that until all the latter is converted that it will exert no action; but if an acid, such as nitric acid, be added, it will exert its proper influence, though slowly. For it will convert any oxide or compounds of the oxide into nitrate, and from the silver sub-bromide dissolve away the loose atom of silver, converting the sub-bromide into bromide and nitrate. Thus:—

$$4Ag_2Br + 6HNO_3 = 4AgBr + 4AgNO_3 + N_2O_3 + 3HO.$$

After an emulsion has been washed, naturally any one of these agents will remove the fog; but they must be added cautiously, otherwise insensitiveness must result. W. DE W. ABNEY, F.R.S., Capt. R.E.
—*Photographic Journal.*

NON-CONVERGING PERPENDICULARS IN ARCHITECTURAL PHOTOGRAPHS.

[A communication to the Photographic Society of Great Britain]

A STATEMENT has very recently been put before the photographic world which challenges one of the most important laws regulating architectural representations. It is to the effect that vertical lines are not seen parallel to each other, and, consequently, photographers need not attempt to make them so. Now, if this assertion be accepted, and acted upon, photographic delineations of buildings will be liable to the suspicion that truthfulness in them is an impossibility.

As I think that the conclusions drawn from the theory propounded arise from a misconception of the laws of perspective and the reason why they exist, I propose to say a few words which may help to place the matter—viz., the absolute straightness of perpendicular lines in views of buildings—in a familiar way that may be easily understood.

Now, the first thing to be done when the artist begins his work is to establish the station-point of view—that is, to fix how much of the subject he intends to depict. It is absurdly evident that no one can look either straight before him, or upwards, or to the extreme right and left at the same moment of time; therefore, it has been found that the field of view may be determined by an angle of 60°—that is, 30° all round a centre, starting from the eyes; this is theoretically the limit of view, but practically a few more degrees are allowable. If a cone of card-board nine inches long and six inches wide be held before the eye, what is seen through the opening will define how much pictorially may be rightly represented; and the amount, whether the whole or part of the building is to be shown, will then depend upon the distance at which the station-point is fixed. Having settled this matter, the centre or axis of the cone must be held perfectly level, forming a right angle with the vertical lines of the building. In this position all perpendiculars seen through the cone, whether they are situated near to, or far away from, the station-point, will be parallel to each other and to the face or front plane of the cone. But if, when too close to the building, the axis of the cone be lifted in front, in order to see the top, then the plane of the cone and the plane of the vertical lines of the building become relatively altered, and are no longer parallel with each other; so that what were hitherto perpendicular lines become now absolutely horizontal, as seen through the cone, and consequently are amenable to the laws relating to horizontal lines when in perspective.

The deduction to be drawn from this is—that as the plane of the cone, or, as we will now say, the plane of the artist's drawing, cannot, and must not, be in two positions at the same time, no pictorial representation is truthful where it is attempted to show vertical lines upon different planes, amounting, in fact, to an attempt to produce one picture upon two pieces of paper where one is flat and the other tilted. And it is just this idea of the plane of the picture being movable that I take to be the main point upon which a misconception has arisen in the statement referred to. It is also argued that the laws of perspective, if carried out, would necessitate that vertical lines should lean towards each other; and, as a proof, it is assumed that a square tower 200 feet high and forty feet wide must be depicted narrower at the top, because there the building is further from the spectator than the lower part on the ground.

Now, as this possibility of the top of a high building appearing actually narrower than the base has no doubt often occurred to photographers, it will be as well to examine into this special matter more closely. First, then, what is perspective? Stated in a plain and simple way, it is the means by which, on a perfectly flat surface, objects both far and near can be depicted correctly and precisely in the same relative position that they bear to each other. What such a view should be when shown upon a flat surface, when parallel to vertical lines, we have before us every time we look out of a window, for there, apparently, is depicted a picture; and by keeping the eye at a fixed station-point of distance from the glass this picture can be outlined with white paint, the result being an absolutely literal transcript of the objects seen, both vertically and horizontally and in perspective. Now, it is from a consideration of the reasons why this natural picture on the glass is found to be true that certain geometric deductions have been laid down, and which constitute the laws of perspective; so that, with the aid of the laws, we can produce a true representation of any building on an opaque flat surface.

Having, then, shown that the station-point of distance from the building, and the parallelism of the vertical plane of the drawing-board, or window, with the vertical lines of the building, must of necessity be strictly attended to, before a single line of imitation is attempted, and as in the statement referred to the writer says—"There is no reason why the laws of perspective should not affect objects more or less distant in a vertical direction in just the same way that they do those in a horizontal direction," I will now endeavour to show that perpendicular lines do not converge, and that, consequently, vertical perspective does not exist.

We will return to our window and imagine that right opposite to us is a street 600 feet in length, at the end of which is a tower 200 feet high and forty feet wide. With the eye fixed in one place at a distance from the window about the length of the cone, paint the outline of the tower upon the glass and then measure the same, and it will be found that the two perpendicular lines are perfectly straight, that they are as far from each other at the top as they are at the base, and consequently do not converge, although the top of the tower is farther from us than the base is. The reason why this must be so will now be explained:—Suppose we attach wires to the two top corners and the two base corners of the tower and bring them altogether to the station-point where the eye is fixed. If, then, from the two upper wires other wires are suspended at equal distances from the eye the wires will be true vertical lines, being perfectly parallel with the plane of the window or drawing-board; and, supposing that a series of similar wires were suspended all along the distance between the tower and our station-point, these wires when looked at on either side must coincide, and will eventually intersect the outside vertical lines of the tower. In bringing the eye back again these wires would also represent a gradual reduction in size of the tower, and be geometrically perfect in the relation of one wire to another, so that when they arrived at the window we should find that the vertical lines were perfectly parallel with each other. Therefore, a true representation of the tower, as far as its vertical side lines are concerned, is nothing more than a section of the space enclosed between the two vertical wires (wherever they may be) cut off parallel with the plane upon which such representation is made; and, whether we cut off a small section, as seen on the window, or a large one further off, the distance apart of these suspended vertical lines must always be equal, and so cannot diverge.

The same natural law or result can be illustrated in a very marked way by supposing that the tower is brought 300 feet closer, thus increasing the angle of view to more than 60°, with the plane of the window-glass still parallel with the perpendicular lines of the tower. By keeping the eye at the station-point of distance we paint the outline again upon the glass, and, although the top is now still farther away, compared with the base, than it was in the first instance, still the lines upon the glass will measure equal distances apart as they did before. Thus, even in this extreme case, the vertical lines do not converge.

Precisely the same thing occurs when depicting horizontal lines, not in perspective, but *parallel* to the plane of the picture, as when looking at a row of houses on the opposite side of the way, and extending sideways to one side of our picture. Here, although the roof-line seems to converge, the true representation of it must be perfectly horizontal or straight, because the same law rules here as in the case of perpendicular lines, viz., that a true representation of the roof and ground lines, being horizontal, is nothing more than a section of the space enclosed between the two horizontal wires (wherever they may be) cut off *parallel* with the *plane* upon which such representation is made.

I will now illustrate, in this gallery, the result of horizontal lines seen under the conditions just named; and, by parity of reasoning, it will be evident that the same result must follow in the case of perpendicular lines.

I look at the cornice line of the ceiling on the opposite wall, and, turning my eye along the whole length of the room, the line appears to be depressed or converging. I hold a sheet of glass quite vertically, and also *parallel* to the *plane* of the opposite wall, and, keeping my eye at a fixed distance from the glass, I trace the cornice line throughout its entire length, and you see that the result is a perfectly-horizontal line, being at right angles with the perpendicular edge of the glass, and so it becomes a true representation of that side of the room, so that not only vertical but horizontal lines, when parallel to the plane of the picture, are not subject to any convergence or depression of position.

The examples I have given also illustrate what I first alluded to—the importance of the station-point of distance—because, in looking at a picture, the distance that the eyes should be from it is regulated by the angle fixed upon for the amount of subject included. Now, looking at the outline on the glass of the tower at 600 feet distance, which is represented through an angle of 60°, any distance may be chosen outside nine inches. When the tower was only 300 feet off, the angle being more than 60°, the eyes must be fixed at the nine inches distance; and when, as in this room, the angle is 90° then the distance from the picture must be less than nine inches; so that it is only when viewed from the proper point of distance that the picture is perfectly like what the original appears to be. Thus, with the eyes as close to the glass as they were when the cornice line of this room was depicted, the line which is actually horizontal or straight will then appear to converge the same as the original.

It will have been noticed that I have carefully refrained from alluding to photographic representations in any way. This has been done purposely, because the conditions under which the photographer works are so totally different to those I have described as appertaining to the artist that no comparison can be made between them. For instance:

the photographer does not cut off a section of the wires, or, as we must now say, the rays of light, running between the object and the station-point. The image has first to repeat itself, and, as it were, begin its existence over again, and what this new existence is to be must be dependent upon the perfection of the optical and mechanical instruments used to produce the second image. Therefore, the application of this matter of the laws of perspective lies in their results being accepted as standards of right and wrong; but, having this knowledge to assist him, the photographer will be expected and required to use all the skill he possesses to realise the conditions laid down, so that the representation he produces may be accepted as perfectly true, both in its pictorial and relatively scientific aspect. EDWIN COCKING.

ON THINGS IN GENERAL.

NORTH and South are often used to typify extremes; but if we go to the north and south of our island (say to the Edinburgh and South London Photographic Societies), instead of extremes I think we shall find a very gratifying uniformity in the practical and useful nature of the papers read and the attendant discussions. Quite recently, in the former society, two papers by the Rev. H. J. Palmer and Mr. W. T. Bashford have been read which deserve much praise for their usefulness and their practical character. The full manner in which the former gentleman has published the details of an important process, and the latter given a thoroughly practical essay on enlarging, are examples that may be well followed by others.

If we were to poll all the dry-plate workers, I think the supporters of gelatine emulsion in one or other of its forms would muster well to the fore. Mr. Palmer's very interesting paper will further help to swell them. That there are yet difficulties to overcome and improvements possible is a matter of course; the wonder is that there are not more in a process comparatively so new. Thus, Mr. W. H. Davies, at the meeting where the paper was read, pointed out the frequent occurrence in dry-plate work of halation and also of negatives which must be called "underdone." There is no doubt in my mind that a quality of an objectionable character, which is mainly due to halation, is more frequently seen than not in dry pictures, and gives an effect of cloudiness and unevenness in the darker parts of the picture.

A considerable proportion of under-exposed negatives may be due in the pictures of enthusiastic workers to the always-prevailing anxiety to prove that dry is as quick as wet. In connection with this point I should very much like to know the meaning of one portion of the report of the South London Photographic Society, on the 7th instant, where it describes a negative of an interior of a room taken by gaslight by an hour's exposure. If there were nothing exceptional in the size of the room or the number of gaslights I can only say it is a marvellous feat; but that an ordinary interior, with the usual objects, can be taken by the aid of gaslight alone in an hour's time I make bold to disbelieve entirely.*

The great event of the hour is the lapse of the great carbon patent, and the possibilities in the direction of rival tissue-makers. Already the air is full of rumours of new makers and wonderful tissues to come; but it is not likely the well-known Autotype Company will suffer, more especially in the face of the dignified and generous course they have taken in the matter. Some may say they could not sustain their rights if they had been infringed. That may pass; they have, at anyrate, removed difficulties, and their course is as wise as it is praiseworthy. It is difficult to say what will be the end of the alizarine discussion. Every attempt must be made to ensure permanent pigments, or pigment pictures will receive such a blow that its effect will take years to recover. I have in these letters alluded to the desirability of banishing anything connected with cochineal. It is to be hoped that the necessary chemicals used may not rob madder tints of their reputation.

There has been some correspondence lately on packing negatives, in which all sorts of very nice plans have been proposed. They, however, all appear to me to be so much paper wasted; for what packing could be better than the method in which we get the raw material—the glass plates themselves. I have seen thousands of plates unpacked after having undergone a long journey, but never saw a single one broken. If anyone wants to pack his negatives up, what could be better than simply tying them up in packets of (say) three dozen, and then putting them in a box close to one another, with a little straw well jammed in between them and the sides of the box? Eggs, even, are packed in tens of thousands in layers after this manner, and often sent hundreds of miles by rail without a single breakage. Could we have a better example?

FREE LANCE.

* "Free Lance" is referred to the sub-leader in another page.—EDS.

FOREIGN NOTES AND NEWS.

CARBON PRINTS IN TWO COLOURS.—DR. RICHARD'S EXPERIENCE OF AFTER-LIGHTING.—THE ILLUSTRATION IN THE *MITTHEILUNGEN*.—AUGMENTING THE SENSITIVENESS OF DRY PLATES.—DEVELOPMENT WITHOUT PYROGALLIC ACID.—VIGNETTING MASKS.

IN the *Archiv* Dr. Liesegang has an article on carbon pictures in two colours, intended to imitate the effect of drawings on coloured paper with black and white crayons, such as Julien's well-known studies of heads—"*aux deux crayons*"—or of drawings on tinted paper, in which the high lights were scratched out with a penknife. The first method by which Dr. Liesegang would produce the effect with carbon pictures is by transferring the prints without collodion to grey paper, and when the pictures were mounted and otherwise finished he would put in the white lights with white oil colour. Another mode requires specially-prepared tissue—that is, tissue with two superimposed films, one of ivory black and the other of sepia. The late M. Braun, of Dornach, some six years ago showed Dr. Liesegang a large picture produced in this latter way, but the process never came much into use.

In the same journal Dr. Richard, of Maennedorf, says that in the winter time he makes a practice of after-lighting children's portraits, and has had a special camera constructed for the purpose. Supposing that on a particularly cloudy day, about nine o'clock in the morning, he has got a negative of a child with an exposure of two seconds, this negative, when developed, would not furnish a useful proof; so he replaces it in the dark slide and exposes it for three or four seconds longer in the special camera, after which he rinses and washes it well in cold water in the dark room and then fixes it. The camera in question is of peculiar construction; but it would appear that any camera would do for after-lighting, if the lens were taken out and a piece of white paper stretched over the opening. Dr. Liesegang thinks that the after-lighting should not exceed three-fifths of the whole exposure. Should the after-lighting be insufficient, it is not allowable, or at least it is not advisable, to repeat it.

The illustration to this month's *Mittheilungen* is a lichtdruck reproduction, by Bierstadt, of New York, of the photographs by means of which Professor Draper discovered the presence of oxygen in the sun.

In the *Photographisches Wochenblatt* Herr Düby describes several ways of making masks for vignetting. The first method is somewhat elaborate. He cuts a number of ovals—say eight—out of black and white pasteboard alternately, and, beginning with the smallest (a white one) he increases the size of each by a centimetre until the requisite number is cut. He then takes up the smallest oval and fixes the exact centre of it to the end of a stick; one centimetre behind he places the black one next in size, then at the same distance behind that again the third oval, and so on. When they are all arranged the opposite end of the stick to that bearing oval No. 1 is fixed in a horizontal position to the wall or a board, and a rather powerful negative of the series of ovals is taken of any size that may be desired, care being taken to focus so that none of the edges of the ovals are sharp. A glass plate is then rubbed with ox-gall, and over it a mixture of the following composition:—Ten grammes of good gelatine dissolved in 100 grammes of water, to which two or three drops of a saturated solution of potassic trichromate had been added for each gramme of the gelatine, is poured, care being taken to avoid air-bubbles, the mixture being assisted to spread by a glass rod. The addition of a few drops of ammonia to the gelatine is also advisable. The plate is dried in a horizontal position, and, when possible, in a warm room. When dry the plate is exposed under the negative sufficiently long to get a powerful print, and is then thoroughly washed in cold water to which a few drops of nitric acid is latterly added; and, lastly, the plate is tanned in a four-per-cent. solution of alum. If it be wished to have the gelatine mask without the glass, then before coating the plate with the mixture given above rub it with oil of turpentine and talc, and when the printed, washed, and dyed mask has become dry cut round the edges of the plate and it may easily be lifted off.

Another way of getting an unbreakable gelatine mask is given by the same gentleman. It is a combination of several other plans, and gives, he says, good results. He takes a clean glass plate and rubs it first with oil of turpentine and then with talc. He has meanwhile made a fifteen-per-cent. solution of very white gelatine, to every litre of which, stirring all the time, fifteen drops of a saturated solution of chrome alum are added, and the still warm mixture is filtered through muslin. If rather too much chrome alum has been added, so that the mixture becomes thick, fluidity may be restored by the addition of a little glacial acetic acid; but it is better if one can do without having recourse to the corrective by using exactly the right quantity at first. The prepared plate is laid in a horizontal position, and the gelatine solution poured equally over it until it forms a film three millimetres in thickness. In the same position it is left to dry. A powerful print on black or dark brown carbon tissue is now made—procured from the negative previously described. The print when sufficiently exposed is dipped for a short time into cold water and then withdrawn, and laid, pigmented film undermost, upon a glass plate and squeegeed thoroughly. It is then dipped for a short time into a solution of white wax in alcohol, and when removed from this solution it is laid upon the now dry gelatine film on the glass plate, squeegeed, and set on one side, under a weight, for half-an-hour. The print is then developed as usual, tanned in a four-per-cent. alum solution, and dried. When dry run a knife round the edge, and the unbreakable mask will come freely off from the glass.

M. Boivin recommends the following course of treatment in order to increase the sensitiveness of dry plates, but it is said to be especially applicable to the Taupenôt and similar processes:—The plate is sensitised by a rather shorter immersion in the bath than is usual with dry plates, and, after washing, is flooded two or three times with a solution composed of—

Phosphate of soda	2 grammes,
Pyrogallic acid	2 decigrammes,
Water	100 c.c.,

and allowed to dry spontaneously. The pyrogallic acid may be omitted, but the degree of sensitiveness is not so great. The development is performed by means of a solution containing both gallic and pyrogallic acids, to which a few drops of a five-per-cent. solution of phosphate of soda are added. After this has been allowed to act upon the film for a short time, a further addition is made of a small quantity of a solution containing equal parts of the nitrates of silver and lead and a trace of acetic acid. If a further quantity of this solution should be necessary a little acetic acid must be added with it. Though theoretically the phosphate might be expected to reduce the sensitiveness, practically M. Boivin finds the contrary to be the case. It is not necessary to wash the plate very thoroughly after sensitising, as any free nitrate left in the film is converted into phosphate of silver. The exposure required with plates treated in this manner is stated to be about twice that of good wet plates.

M. Queval states in the *Moniteur* that dry plates prepared with a preservative containing gallic acid may be rapidly developed in the following manner:—Lay the plate, after exposure, face downwards in a dish of rain water, so as to wet the whole surface without removing the preservative unequally. It is then completely flooded with a solution composed of four parts each of silver nitrate and acetic acid in one hundred parts of water. The development takes place rapidly. The author finishes by stating that he has only tried the method with albumen and collodio-albumen plates, and *that he has obtained very unequal results*—a statement which we can readily credit.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 28	Liverpool Amateur	Free Library, William Brown-st.
„ 28	Oldham	Hare and Hounds, Yorkshire-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

We now redeem our promise made last week of giving the report of the discussion which followed the reading of Mr. Edwin Cocking's paper *On Non-Converging Perpendiculars in Architectural Photographs* [see page 138], for which report we are indebted to the organ of the Society.

Captain Abney observed that the whole secret of perspective seemed to be in the use of the vertical plane, but it required a physiologist to tell us why that plane was chosen. Possibly it had something to do with the axes of the eyes.

The President: All vertical lines are vertical to nature.

Captain Abney said it all depended where we were looking. If he were lying down at an angle of 30° would the lines then be vertical? As a geometrician he could draw a picture on any plane and at any angle. It was a matter of conventionality that had fixed the vertical plane as the one on which pictures should be drawn.

Mr. F. Bedford thought it was a great question whether Mr. Cocking was right on one point. When he followed the line at the side of the room in his example he moved his head, and the line could only be seen as straight when he did so. The effect really was the same as that produced by the pantascopic camera.

Mr. Cocking observed that that was the point on which he laid stress. When studying at the Royal Academy he remembered it was laid down by the instructor, Mr. Knight, that the true representation of an object was not its actual appearance. Now, in looking along the line of the wall, he did not turn his head at all, only his eyes; the head represented the station-point.

The President: What applies to horizontal perspective applies to vertical; but there is no such thing as vertical perspective, as the moment you alter the parallelism of the planes the whole thing is altered.

Mr. Cocking concurred.

Mr. Woodbury contended that in the glass as held up by Mr. Cocking both ends were in perspective.

Mr. Cocking: Certainly not.

Mr. Woodbury: They are farther from the eye than the centre.

Mr. Cocking: If you admit that vertical lines come in perspective, it follows that from your horizontal points they go upwards and downwards.

Mr. Woodbury: The top and bottom are farther from you, and therefore appear smaller to the eye.

Mr. Sawyer observed that the article he recently wrote on the subject had given rise to the paper. He would not, however, then discuss point by point with Mr. Cocking, preferring to see the paper in print. What he said was simply this: if you take your stand at the bottom of a street and look down it, you notice that the sides gradually approach until they come to converging point. He carried that reasoning further, and held that if you stood at the foot of a tower and looked upwards, you saw also the lines of the tower recede from the eye until they also came together. Now, supposing the tower was 200 feet high and the camera be placed at such a distance so that the whole be brought into the field of view covered by the lens, he maintained that, supposing the lines were vertical, the camera being farther from the top than from the bottom, the lines as presented by the camera must necessarily converge. The mistake was in attributing to the camera only the same range and the same amount of subject as seen by the eye, because, in looking at the tower, the eye only saw a very small portion at a time, and it had to roam up and down in order to get any impression of the tower at all; consequently, lines appear straight, though in reality they are not so. Mr. Cocking had mentioned an experiment with wires, and he had put the spectator at some considerable distance from the tower in his illustration; but the principle was the same, though the amount of the convergence was so small it was impossible to detect it. He thought an experiment to prove this could be very easily carried out, and he would undertake at the next meeting to bring an example which would decide whether his or Mr. Cocking's views were correct. He would put on a wall of some high room a sheet of white paper whose sides were vertical, and at one-third of the height (?) place a camera perfectly level, and he thought it would be found that though the lines were vertical they were in the picture smaller at the top than at the bottom. (A member: No.) Well, that remained to be seen. If the distance from the bottom was greater than that from the top, then the bottom would be smaller. If the camera were placed exactly in the middle, then both the top and bottom would be smaller than the middle. He saw the opinion of the meeting was dead against him; nevertheless, he held to his own views.

Mr. Hughes observed that, the planes being parallel, vertical lines must also be represented parallel.

Mr. F. Bedford pointed out that although it was true that in the case of the tower the top was farther from the camera than the bottom, it must be remembered that to represent it correctly the swing-back must be used. The plane of the delineator must be parallel to the object represented. As regarded the eye, it subtended about 30°, but it was always rolling, and for the time being only represented the vertical lines towards which for the moment it was turned. When looking along the side of a wall the eye turned itself round and adapted itself immediately to the horizontal line. In drawing, the whole principle of vertical perspective was based upon the theory that the eye was actually parallel to the object represented. That was not always the case, but the distortion was corrected by the knowledge that the objects were true, and that the planes must be parallel.

Mr. Woodbury: If you lie on your side you have no parallelism.

Mr. S. Davis remembered in joining in a similar discussion some years since, when Baron Pollock was presiding, and the view he took of the matter was that the size of every object corresponded to the angle in which it was viewed. Take the case of the Victoria Tower. The top of the tower being considerably farther from the eye than was the bottom, the angle subtended of the latter in the eye would be much larger than in the former case. If, then, the extremities were connected the lines would be found not to be parallel. But that in a picture would be extremely unpleasant to the eye, although as a matter of perspective it would be quite correct.

Captain Abney thought that one point had been lost sight of, and that was that as a rule they did not see true perspective in a picture—speaking at all events of photographs. Unless the eye were placed at the same distance from the picture as the focal length of the lens, the same view of perspective as in the view itself could not be obtained. That was why the views taken by a wide-angle lens appeared false. It was impossible to look at anything at so short a distance as five inches—the focal length of some of these lenses. If the photograph be looked at at nine inches focal distance the lines of the picture would occupy the same angular position as that occupied by the view itself. The perspective would then be found to be perfectly true, and the vertical lines, if measured, found to be absolutely parallel, though, when looked at from the proper focal distance, they would appear to converge.

Mr. W. Bedford did not quite agree with Captain Abney, as in that case copies of large views would be false; the distance from the view, he thought, must be taken into consideration. If the eye were placed at the distance of the focus a correct idea of the size of the subject would be obtained; but the perspective would be still correct if that size were reduced and it was looked at as a small picture.

Captain Abney: The perspective would be correct, but you would not see it properly. Whether increased or diminished you must see it at the focal distance. That was the great advantage of enlargements.

After a remark from Mr. Bird,

Mr. Cocking said the matter could be expressed as a rule-of-three sum. As the eye was to the drawing or photograph so was the drawing to the view given. If a tall tower was to be drawn it should be drawn with perfectly parallel lines, because the drawing was in a parallel plane; but directly the eye was moved from that plane the conditions were not the same. Looking up, for instance, it would seem narrower. The whole law seemed to lie in that.

Mr. York had noticed the convergence of the lines in a tall tower. He had taken a view of the Westminster tower with a six-inch focal lens, standing at a distance, giving an angle of 45°, but had not seen the convergence spoken of by Mr. Sawyer. If the subject were to be discussed at the next meeting he would bring some examples in which such convergence did not exist. The camera, of course, should be perfectly level. A swing-back he never used.

Mr. Vernon Heath drew attention to a photograph on the wall of a large building, which was taken for the purpose of testing a Steinheil lens. In that photograph not the least convergence could be discovered.

The President said he recollected some years ago writing a treatise upon the subject. All vertical lines in nature must be vertical when depicted on a vertical plane. A view, as seen through a pane of glass, was really what a picture represented. He thought perhaps the best way would be to adjourn the discussion until the next meeting, when Mr. England would read a paper on dry processes—a subject which would be in accordance with the offer which had been made that evening.

It was then decided to adjourn the discussion until the next night of meeting.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The monthly meeting of this Society was held at the Memorial Hall, on Thursday evening, the 14th instant,—Mr. Alfred Brothers, F.R.A.S., President, in the chair. The minutes having been disposed of, Messrs. Watson, Schofield, and Harrison Garside were elected members of the Society.

Mr. Pollitt then exhibited a compact folding-stand for the camera.

Mr. Colin Mather showed a little cone-shaped camera for quarter plates.

Mr. Schofield exhibited a collapsing lens mount, which he purchased some time ago. He did not know the name of the maker.

Mr. J. Holding called attention to the fact that burnt-in pictures on wood fade, or otherwise disappear, under the action of sunlight; but when the surface of the wooden block was charred first, and the lights and middle tints obtained by scraping, fading did not occur.

Mr. J. Chadwick suggested that the fading was probably due to the falling away of the particles of carbon caused by expansion and contraction, which would naturally ensue from exposure to the heat of the sun.

The Secretary showed some prints on Durand's matt paper, and said none but strong negatives would succeed with it.

Mr. D. Young exhibited one of Keevil's perfected lanterns, and showed its capabilities by exhibiting the *Gabriel Grubb* pictures on the screen. The prism disc was quite equal to the direct one. Mr. Young produced the oxygen during the exhibition by means of his generator.

Mr. W. J. Chadwick then exhibited a microscope adapted to the sciopticon, using Mr. Woodbury's lime-light arrangement, and showed a number of objects on the screen. The microscope was very good as far as it went, but the lenses were not achromatic.

After the customary complimentary votes the meeting was adjourned

Correspondence.

Carbon Printing in Australia.—Photography in Sydney.—Proposed Photographic Society in Sydney.—Spirit Varnish.—Proposed Improvements in Carbon Tissue.

Ninety-two degrees in the shade, and carbon tissue waiting to be sensitised! I think you will admit that the prospect was not very encouraging, but it had to be done, and was done. So many formulæ have been given for all sorts of preparations that it really seems of little interest to send you mine. Nevertheless I do so, hoping that it may be found useful by some one who, perhaps, has had some difficulty in warm weather. Make up the following and filter:—

Water	200 ounces.
Bichromate of potash	6 ,,
Alcohol	50 ,,

Place the bottle containing the solution in cold water, and keep cool by adding a little ice to the water. When about to use it place a lump of ice in the vessel with the solution, and on the glass slab used for laying the tissue upon for the purpose of squeegeeing out the excess of liquid put several small pieces of the same substance, moving them about until the glass is pretty cool, which will take about ten to fifteen minutes. Immerse the paper in the bichromate solution, prepared side downwards, excluding all air-bubbles; turn it over, return it, take it out, lay on the glass slab, pass the squeegee over it, and hang up to dry. In this way I have been preparing pieces of tissue thirty by twenty-four inches, and have not had any trouble or failure. You will observe that the tissue only remains about one minute in the bath, which is about the time required for it to become straight, and sufficiently long for such an elevated temperature. The tissue used was "autotype brown," bearing date "8/6/76." Whilst on the subject of carbon let me tell you that it has already been tried here, but some have given it up, finding that it was not appreciated by the colonists, who did not like to pay an adequate price for an unalterable photograph. Others found it was not practicable in such a warm climate. It is now, however, beginning to find favour with some of the best houses here.

Photographers are rather numerous here for the size of the town, and prices vary from ten shillings per dozen to one guinea, the average price being twelve shillings. There are fewer views taken proportionately to our seaport towns, and there seems to be but a very limited sale for them. Of photo-mechanical processes there is nothing at all.

Last month a circular was issued for the purpose of establishing a photographic society here. From some cause or other the attendance was most meagre, and another evening was fixed for the same purpose, but with no better result, and a final meeting was called to see if twenty persons could not be found to establish the society; but, shame to say, only fourteen presented themselves, the leading photographers being conspicuous by their absence. It would certainly be a very agreeable thing if a society could be formed out here, where, apart from the usual meetings, we could embrace the advantages nature has given us, and make one or two photographic excursions during the summer, when the wet and dry processes might be brought into competition with each other, and not only become a source of pleasure for their various advocates, but benefit the colonial photographers generally. Those of my *confrères* out here on perusing this will do well to ask themselves if that spirit of seclusion is calculated to really advance our art-science. We must look a little ahead of our personal affairs, and if we are really lovers of our work we shall then do all in our power to establish a good and useful society, by not only uniting ourselves as a photographic body, but by getting among us a few men who, although not photographers, have still interest in its advancement, and who by their talents and social position will contribute largely towards the society becoming one of renown. It is very much to be regretted that this attempt to form a photographic society has not succeeded. We must not, however, rest here. "Advance, Australia!" is a national password; let not, then, our community be the last on the list.

If Mr. Daniel requires a varnish well balanced in its gummy parts, let him take the following:—

Benzoin	10 parts.
Gum sandarac	7½ ,,
Gum mastic	5 ,,
Spirits of wine	100 ,,

Let it digest for two or three days in the sun or warm water, and when dissolved (less the insoluble matter in the benzoin) a perfect varnish will be the result. Apply with heat.

Apropos of Mr. Johnson's improvements in carbon tissue, can you inform me if any paper is yet made with two or more layers of gelatine, each layer having a different colour? I have had a great deal of trouble in getting the different layers to so bind as to form a harmonious whole on developing. There is no doubt that a great deal depends on the temperature of the liquid after the first coating. I found that thin or weak solutions at a low temperature succeeded best. Too much attention cannot, I think, be given to the temperature. I am sorry to have to say that as yet I am not satisfied with my results, and have given it up for want of time. I feel sure that if the Autotype Company could produce a paper giving the same difference of tone that the albumen paper does they would confer a boon. L. H.

Sydney, January 28, 1878.

RAPID GELATINE EMULSION.

To the Editors.

Gentlemen,—I have to thank you for directing my attention to the gelatine negatives by Mr. Bennett now in your possession.

Permit me as one of the earliest workers with gelatino-bromide emulsion to say that if Mr. Bennett could be induced to publish his formula for gelatine emulsion he would doubtless confer a favour on many amateurs who work the gelatine process. The results of his researches, as exhibited in the remarkable negatives now at your office, are in rapidity far beyond anything I have been able to produce.

Will Mr. Bennett tell us how it is done? He would thereby oblige, among others,—Yours &c., "Franklin."

March 20, 1878.

The Camera on Mount Tongariro.—We learn from our contemporary, *The Colonies and India*, that the celebrated burning mountain of New Zealand, Tongariro, has at last been explored by an Englishman, Mr. P. F. Connelly, a sculptor, who has recently succeeded in ascending to the summit. The volcano is regarded as *tapu*, or sacred, by the Maoris, who have hitherto resisted all attempts to explore the mountain on the part of the colonists. Though he did not meet with any personal resistance, Mr. Connelly found every obstacle placed in the way of his progress by certain of the natives, who took possession of his horses, guns, saddles, and nearly all his outfit, including his sketches. He, however, overcame all resistance, and, by the help of some chiefs more friendly than the rest, succeeded in thoroughly exploring the crater, took a number of sketches and photographs of the locality, and determined the positions of the most important peaks. The exploit promises to have permanent results by opening up the hitherto unexplored portions of the colony to adventurous tourists; and as it has been achieved without forfeiting the goodwill of the superstitious natives, it will, no doubt, be emulated by other explorers, and thus will be the means of affording a new field for scientific and artistic research.

EXCHANGE COLUMN.

Several good cameras offered in exchange for cabinet burnisher or good backgrounds.—Address, A. Lee, photographer, Walcot, Bath.

I will exchange a 10 × 10 square bellows-bodied camera, with three double dark slides, in leather case complete, for a good posing chair or anything useful.—Address, J. White, photographer, Littlehampton.

I will exchange a Voigtlander's rapid B lens, cost £8 17s. 6d., for a good whole-plate lens, three and a-half inches in diameter, and about nine inches focus; maker's name no object, but a trial required.—Address, H. Dyball, 3, Lower Notting Hill-terrace, W.

ANSWERS TO CORRESPONDENTS.

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

*** We have received just as we are going to press, and consequently too late for insertion in this week's number, Mr. Brightman's paper on *Whims and Fancies of a Landscape Photographer.* By some oversight it was omitted to be forwarded with the report of the meeting which appeared in last week's issue.

Geo. D. Wilson.—The letter has been forwarded.

E. F. G.—You do not distinguish between moonlight *pictures* and moonlight *effects*.

Stationer.—We strongly disapprove of such an application of photography as that about which you write.

W. (Manchester).—The advantage of cadmium over ammonium lies in its producing a much more stable collodion.

S. H. Lee.—A better landscape negative can be obtained by making use of a landscape lens than by means of a portrait lens with a small stop.

Philo (Hornsey).—Of the various processes mentioned in your list the collodio-albumen yields the hardest film, and for this reason will best serve your purpose.

T. B. B.—A mixture of perchloride of iron and tartaric acid for producing ceramic photographs was patented in this country by M. Poitevin, but the patent has long since lapsed.

X. Y. Z.—Unless you support your statement by adding your name and address we cannot insert it in the Journal. It is probable that you misconceive the true facts of the case.

G. B. Stanton.—Gold is precipitated by protosulphate of iron, and silver by metallic copper. In all other respects you are correct. We shall be glad to learn how you have succeeded in your lecturing experiment.

George Scott.—By having a hinged table placed upon the top of the camera-stand the camera may be directed upwards towards the sky when you employ it in the printing of transparencies by the collodion or other process.

W. H. A. T.—Sometime ago we made numerous trials of Cook's patent camera, and were much pleased with it. We invariably succeeded in transferring the sensitive plates from the receptacle to the exposing-plane without a single hitch.

Etonian.—If a glass vessel suitable for the purpose can be obtained so much the better; but in the absence of such a vessel an enamelled saucepan will make no bad substitute; indeed, if the enamel be good, it will answer quite as well as the glass vessel.

Cyanide.—No such serial as the *Stereoscopic Magazine* now exists. About twenty years ago a magazine bearing this designation was published by Mr. Lovell Reeve. It was issued monthly, at half-a-crown, but was discontinued after a short time.

F. Anderson.—The series of articles on colouring photographs which have recently been published in this Journal will be found to form the best manual of practical instruction in that art that has yet appeared. The complete series can be obtained on applying to our Publisher, all the numbers being still in print.

Geo. Hardy.—1. To produce a negative having a granulated grain obtain a piece of granulated cardboard, and allow a beam of light to fall obliquely upon it; then photograph it.—2. A letter addressed to Messrs. Brown, Barnes, and Bell, Liverpool, will ensure your obtaining all the requisite information regarding the working of the patent process.

L. Sims.—The dingy, fogged, whites in the developed enlargements are most unmistakably due to the want of acid in the sensitising solution. Add a large proportion of glacial acetic acid to the silver bath, and you may depend upon getting perfectly clean pictures by adhering to the method you have sketched in your letter.

Obliged Reader.—1. Bitumen of Judea may be obtained from any drysalter.—2. The lecture will be published in the course of the ensuing summer; but it, and the others of the series, will necessarily lose much of the value attached to their delivery by the absence of the numerous illustrative experiments by which they were accompanied.

Opticus.—Lacquer that will dry bright when applied to cold brass can certainly be prepared—a fact of which we shall be happy to afford you ocular proof if you call at our office in the course of any forenoon, bringing with you a slip of polished brass upon which to try the experiment.

An Old Friend.—Yes, it was one of the best processes at the time the statement was made; but that was fourteen years ago, and photography has not been standing still during the period which has since elapsed. We never offer any opinion as to which lens or camera, or whose collodion and chemicals, are best; and hence recommend you to study carefully our advertising pages.

F. R. S.—Several formulæ have been published for producing alabastrine positives. The following is one which we have not tried, but which is said by a friend to produce quite as fine results as any that have ever been published. After fixing the collodion positive with cyanide of potassium wash it thoroughly, place it on a levelling-stand, and pour over it the following solution:—

Saturated solution of bichloride of mercury in hydrochloric acid	12 minims.
Protosulphate of iron	20 grains.
Nitrate of potash	12 ,,
Alcohol	½ drachm.
Distilled water	1 ounce.

The application of this will probably cause the picture to disappear at first, but it will speedily reappear, having a delicate pearliness in the whites. The full effect will be obtained after it has remained on from about fifteen to thirty minutes.

Watson and Son's Trade Catalogue.—We have received from Messrs. Watson and Son, High Holborn, their new catalogue of photographic lenses, cameras, and apparatus. The number and variety of secondhand high-class lenses and apparatus by the first makers in the world here catalogued is truly wonderful, the classification in the work being such as to render quite easy the selection of a lens to suit any given purpose or the expenditure of any predetermined amount of money. The catalogue consists of forty well-filled pages, and its mere perusal is highly suggestive.

Photographing on Wood.—It is one of the conditions under which photographs must be properly reproduced on wood for the engraver that there shall be no varnish or skin to clog or impede the free action of the graver. Hence collodion proves inapplicable. Carbon is much better, but it, too, is disliked by wood engravers on account of the gelatinous substance of the picture. Mr. T. J. West has just perfected a simple process by means of which every objection is done away with, an extremely sharp picture being printed upon the wood with great certainty. Several specimens executed in our presence, and now on view at our office, have elicited expressions of satisfaction from wood engravers who have examined them. We shall refer to this subject in an early number.

LONDON GAZETTE, *Friday, March* 15, 1878.

Bankrupt.

Keene, R., Jun., Derby, photographer.—March 27, Derby.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For the two Weeks ending March 20, 1878.

These Observations are Taken at 8.30 a.m.

March.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
7	30·11	W	45	49	58	48	Cloudy
8	29·99	NW	41	46	56	44	Dull
9	30·26	NE	36	39	48	37	Dull
11	30·27	W	44	46	53	40	Dull
12	30·24	E	42	44	51	43	Dull
13	30·35	NE	36	40	50	38	Fine
14	30·56	N	34	36	49	32	Foggy
15	30·42	NE	37	39	46	34	Dull
16	30.63	E	33	38	43	34	Dull
18	30·37	N	46	49	53	38	Dull
19	30·29	N	47	49	54	47	Dull
20	30·44	NW	46	49	56	47	Dull

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 934. Vol. XXV.—MARCH 29, 1878.

BLOCKS FOR WOODBURYTYPE PRINTING.

Those conversant with the Woodbury process of printing are well aware that in practice—that is, as carried out by the three or four firms in the world who execute work of this kind—the metal printing block is produced from the gelatine relief by pressure, the most extreme pressure being required. Up to the stage at which the services of the hydraulic press are demanded the process is one within the range of every photographer; for, as may well be imagined, in the production of a gelatine relief is not involved the necessity for possessing apparatus other than may be found in every studio.

We have received inquiries as to whether it is not possible to produce Woodbury printing moulds or blocks by other means than the expensive hydraulic press. In the following remarks will be found an answer to questions of that nature.

As an historical fact the Woodburytype process of printing had been in existence for some time, and many examples of the process had been produced and issued, previous to the conception of the idea of using the hydraulic press. All the first specimens of Woodburytype —several of which are still in our possession—were obtained from electrotypes. In the description of the process published in this Journal on March 17th, 1865—more than thirteen years ago—special mention was made of the fact that the printing surface was obtained by means of the electrotype process. As we know that some excellent results were obtained by that method, not only by Mr. Woodbury but by others—and particularly by Mr. J. W. Swan, who about that time sent us some fine specimens of the process of "photomezzotint"—we give a brief extract from the article by Mr. Woodbury to which allusion has been made. He says:—

"A copper mould is obtained by exposing a sheet of bichromated gelatine behind a negative, and exposing to parallel rays of light; then washing away the undissolved portions and taking an electrotype cast in copper. This mould is then backed with gutta-percha, and placed in a suitable press having a sheet of plate glass, with strong springs, let into the back."

In the specification of his patent, published about the same period, Mr. Woodbury described in what manner the surface of the relief might be rendered conducting, namely, "by brushing it over or otherwise coating it with bronze powder, plumbago, or silver precipitated in metallic form." Our object in mentioning this is to show that the expensive hydraulic press, although a desirable assistant in the production of Woodburytypes, is by no means an indispensable adjunct to that process.

Another and still simpler method is that of producing the metallic printing-block or mould by means of fusible metal. It has been found that if the gelatine relief be mounted upon glass so as to retain it in a perfectly flat position, and a border of wood or any other suitable material be placed round the picture, an accurate cast of the gelatine picture, with its heights and hollows, may be taken in fusible metal. This metal, as every tyro in chemistry is aware, is an alloy in which bismuth is invariably present. It may be compounded in such a manner as to have its melting-point so low as to cause little or no apprehension that the glass plate will be cracked, more especially if the plate be warmed before the molten metal is poured upon it. It is found, however, that in cooling the lower surface of the metal rises up from the glass in some parts—an objection quite fatal to its application to Woodburytype. But the ingenuity of Mr. Thomas Bolas has proved more than sufficient to meet this difficulty, as was demonstrated at a recent Cantor lecture before the Society of Arts. Running to earth the evil complained of, Mr. Bolas found that it was caused by the solidification of the melted metal being commenced at the upper surface, and he argued that if the opposite state of things were established a uniformly sharp casting would be the result. To induce this condition Mr. Bolas, when making a Woodburytype cast in fusible metal, keeps in readiness beside him a vessel containing hot sand, and as soon as he has poured his melted metal upon the glass plate, which is lying in a horizontal position, he immediately covers it with a mass of the hot sand. In this way the upper stratum of the metal is kept in a state of fusion while the lower portion is becoming solidified by contact with the glass plate.

As we believe the method just described is capable of yielding good results, and may be very valuable for experimental purposes, we shall give a few formulæ for the preparation of fusible metal suitable for the purpose indicated. First of all, we would inform those whose knowledge of metals, and especially of alloys, is limited that by melting together two metals the alloy resulting from such mixture may be one not necessarily possessing any of the properties of either of "its parents" or the components of which it is formed, but have qualities altogether distinct from them and peculiar to itself. Thus, copper and tin are both soft and ductile metals; but if only one part of the latter be mixed with nine parts of the former, the rigid "gun-metal," which can neither be drawn nor rolled, is produced. By increasing the proportion of the softer metal an alloy is obtained possessing such hardness that it cannot be cut with steel tools, while the red colour of the copper entirely disappears, giving place to a silvery whiteness, as in speculum metal, which is thus compounded. In a similar manner does the metal bismuth change its properties and induce a similar alteration in certain other metals. Its point of fusion is 480° Fahr., and yet when melted with other metals, some of them having a melting point far above this, it produces an alloy or metal (in the non-chemical sense) which will quickly melt if placed in hot water. The following formulæ may here be fittingly introduced:—

Lead, five parts; tin, three parts; bismuth, two parts. This alloy will melt in boiling water.—Bismuth, eight parts; lead, five parts; tin, three parts. This is more fusible than the former.—Bismuth, five parts; lead, three parts; tin, two parts. This melts at 15° below the boiling-point of water. If to the last formula be added one part of mercury the point of fusion is reduced to 172° Fahr., the alloy becoming solid at 140° Fahr. The fusible metal employed in the experiment brought before the Society of Arts, and to which we have already referred, was composed of—bismuth, seven parts; lead, four parts; tin, three parts; nickel, one part. The last mentioned is stated to possess properties distinct from the others; but we cannot yet speak of it from our own experience as we can of the others.

Mr. Woodbury has shown that an excellent and sharp impression may be obtained from a gelatine relief by superposing a sheet of tin foil and dabbing it with a brush. This method used in conjunction with gutta-percha and pressure, with plaster of Paris, or with fusible metal, ought to prove of exceptional value.

PERSONAL NEATNESS IN OPERATING.

Though the old public conception of a photographer as a man with a velvet coat, black hands, and linen of doubtful appearance, unjust as it was, has given way to more reasonable ideas before the advancing status of the photographer of today, there still remains a substratum of truth underlying it. Yet in the actual necessities of busy studio work we see little reason why photographic operators, with the exception of an occasional silver stain, should be any different in their appearance from ordinary unprofessional mortals. Being—outside our editorial chair—in some sense part of the "public," we are, perhaps, better able to look at the doings of professional photographers from an outsider's standpoint, and we thus hear and see many things that the photographer himself would be little likely to hear. We are aware that some persons consider that professional peculiarities should manifest themselves by personal eccentricities; but, to pass that point by as beyond our province, we may be allowed to say that there are some points beyond which it would be unwise, for pecuniary reasons, to pass. Thus, very recently, a lady coming out of a photographer's, after an unsuccessful attempt to have baby photographed, and was heard to say, speaking of the operator, who affected the peculiarity of unkempt locks to a monstrous extent—"No wonder baby would keep crying in front of such a head of hair as that!"

Can any reasonable reader question the truth at the bottom of this little speech? If operators will make themselves unlike other men they must expect to be objects of distrust in the minds of tiny sitters. We confess that to keep cool, physically and mentally, in a close studio and amid the continual worry that besets photographic portraiture must be no easy matter, if even it be possible at all; but that a presentable appearance, even on the busiest occasions, may be preserved we have had proof in various studios we have visited. We have been in one where, half an hour after work had begun, the operator was in a mess, and so he continued till the day was over. In fact, it was his normal state. He could not have taken a picture, we verily believe, if he had clean hands and face; his pictures would go all wrong. Something would be the matter without his feeling what it was exactly. Dirt and untidiness were that man's second nature, and he could not fight against it. On the same day on which we saw this gentleman last we walked, later on in the afternoon, into another studio during a momentary lull in work, and found the operator drying his hands on a towel, having taken advantage of the five minutes to wash his hands slightly—"A fellow can work so much better with clean fingers," he said. This was the key to his appearance, which was just as clean and neat as the other was unclean and untidy. As to their work, artistically speaking, there was little to choose between them; but how much more at ease the latter must have felt when he numbered among the clients of the day many lady sitters! and how much more likely they would be to frequent a studio like his rather than the first named! He told us that he found it necessary to be most particular about cleanliness and freedom from dust in the studio. Everything he used he insisted upon being kept scrupulously clean; and he carried out the same system in his dark room, with great advantage to the cleanliness and evenness of his plates.

We have no doubt a hundred voices will be raised to say it is impossible to keep the hands at any rate free from stains, and that cyanide is too dangerous to be always rubbing their fingers with. Before making a few remarks upon the best detersives we would say that such stained hands as are most frequently seen are not by any means a necessity; it is possible to develope a great many plates and yet have but few stains on one's hands. This is our own experience, and it is borne out by many photographers of our acquaintance. But care must be exercised; and it will be found that the photographer with the cleanest hands will most frequently have the cleanest plates. It will be a sign that he frequently washes his hands, and the handling of plates in their various stages by hands only half cleaned of previously-used solutions is a fertile source of stains. A great help to clean hands will be found in the use of developing holders—"old women's dodges," we have heard them called by the untidy men. That one of suitable shape is no hindrance to quick work we are well assured; we have found, with many others, an actual advantage from their use. We have employed one consisting entirely of india-rubber, mounted on a long handle, and after many trials we have arrived at the conclusion that the plate can be taken out of the holder, and held *in situ* to commence development, with greater rapidity than can be obtained without the intervention of any instrumental aid.

We have in our mind as we write a very clever operator who produces exquisite negatives, but whose hands are never fit to look at, and he informs us that latterly he has been subject to an eruption on them every spring. This may or may not be owing to the continued exposure to the action of photographic chemicals; but nothing is more likely than that this should be the cause, for to see him develope is something wonderful. He dexterously poises the plate on the tips of the finger of his left hand (a wise precaution to avoid stain on the plates) and pours the developer on and off from one corner to another as he deems best, and the way he moves and sways the plate about suggests nothing so much as that he is actually fondling the beautiful pictures he is calling into existence. He is absolutely and utterly regardless of his hands. The developer runs down his fingers back and front, all over his wrists, lodges in the palm of his hand; still he goes pouring it on and off, hugging his picture till all is dissipated. Half-a-dozen negatives submitted to this process leave his hands indistinguishable from his coat, save, perhaps, an occasional brilliant streak of white proclaims that still one spot has been untouched by the stain-carrying fluid.

Granting, however, that some stains must be contracted during a busy day's photography, we may pass on to say something about the means of removing them. A reference to previous numbers of this Journal will show that a multitude of plans have been proposed; and yet a reference to our "Answers to Correspondents" columns will also show that either they have proved inefficient or that they have not been seen by some readers. There are few of them that we ourselves have not tried as soon as they were recommended; but most of the new ones have failed. Taking in the first place articles of dress, shirt cuffs, and pocket handkerchiefs, always the first to suffer, nothing possibly can be wanted to improve the processes we already possess. A strong solution of iodine (iodine and iodide of potassium, one drachm of each added to one ounce of water) used first to dress the silver stain, will convert it into iodide of silver, which will entirely be removed upon the application of cyanide of potassium, and leave the fabric as clean as when first it left the loom. Iron spots are removed with greater difficulty by soaking in dilute "muriatic acid" (one of acid to four of water), or hot solution of oxalic acid, same strength, till the stain disappears. The fabric must then be well rinsed in rain or distilled water, as the stains will reappear if washed in spring water.

For cleaning the hands the chief suggestions in another direction have been the use in some form or other of chlorine. We are sorry to say that in our hands they have not by any means borne out the enthusiastic recommendations of their inventors. To such an extent has this been the case—and recommendations have been given by well-known names—that we endeavoured to find out a cause for the discrepancy, and this, we feel sure, we have done. At the close of a day's work an operator finding his hands all over stains puts them down at once to *silver*, and, trying all his known plans to get rid of them, hits upon some chlorine mixture, which has the desired effect, and forthwith he publishes the new means of removing silver stains, when the fact is all the while that it is not a silver stain at all he has made to disappear, but one from pyrogallic acid! This, we are sure, is the whole secret of the matter.

Pyrogallic acid leaves an inky-toned stain quite different from the warm brown that a simple solution of nitrate of silver causes when applied to the skin, and differing also, but less so, from the colder-toned stain given by the iron developer when mixed with silver. Hence we find that for pyro. stains the chlorine mixture answers well, and also the chromic acid. But for silver stains on the hand the same treatment we have just described for articles of dress is all that can be desired. In place of the final cyanide strong ammonia may be used, which destroys the yellow of the iodine, and leaves a mark behind like dirty white paint—undissolved iodide of silver. If even this slight mark be objected to, the ammonia may be replaced by cyanide, which (with its attendant risks) would remove all the iodine and the silver marks.

We find chromic acid very useful in its place as above, and have not felt any unpleasant or injurious effects from its use. It is next to impossible to wash the stain entirely away by simple cold water, but a little of the strong ammonia used causes it to disappear at once when washing under the tap, and it is further calculated to leave the hands free from any trace of the powerful acid—a contingency which might lead to evil results.

RECENT PATENTS.

No. V.—EASEL ALBUMS FOR EXHIBITING PICTURES.

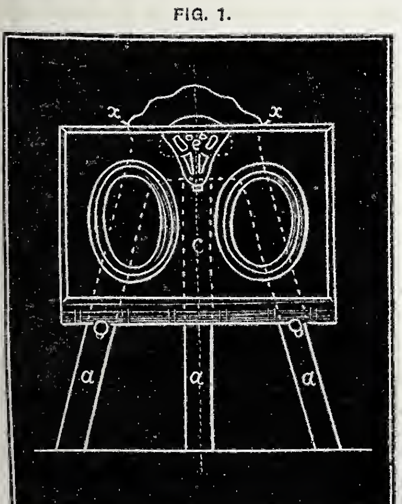
As a fine stone has its beauty enhanced by its setting, so does the method by which a fine photograph is displayed conduce to the effect it produces. For this reason will professional photographers, in particular, look with interest upon every new appliance capable of displaying their pictures in such a manner as to catch the public eye, and thus create a favourable impression.

The following invention, designated "Improvements in Easel Albums for Exhibiting Pictures," has been patented by Mr. John Caspar Koch, of Berlin, and relates to what are known as easel albums for exhibiting a number of photographic or other pictures at once. The invention consists, first, in an assemblage of mounts capable of being displayed in a fan-like form above the album, and of being contracted and slid down into the body of the album, where they are concealed from view. By the adaption of this novel feature to easel albums, their appearance is improved and increased space is obtained for exhibiting the pictures.

The invention also consists in the means hereafter described for operating this fan-like arrangement of mounts, whereby the pictures they contain may be suddenly displayed to view; and it further consists in improved means for facilitating the insertion and withdrawal of pictures, more especially in glazed mounts, to avoid damage to the picture, and in a supporter or leg hinged to the clasps attached to the cover of the album, and which, when the album is opened and the cover turned down, places itself on the table in such a manner that the leaves of the album are supported in a favourable position for inspection.

In order that the invention may be more readily understood, the patentee describes it in detail with reference to the accompanying drawings, in which *fig.* 1 represents a front elevation of the easel album closed; *fig.* 2 a similar view open, and the whole of the pictures displayed; *fig.* 3 represents a vertical section of the same, taken on line *a*, B, *fig.* 2; and *fig.* 4 represents a front elevation, partly in section, the leaves being removed to show the mechanism for operating the fan-shaped mounts at the top.

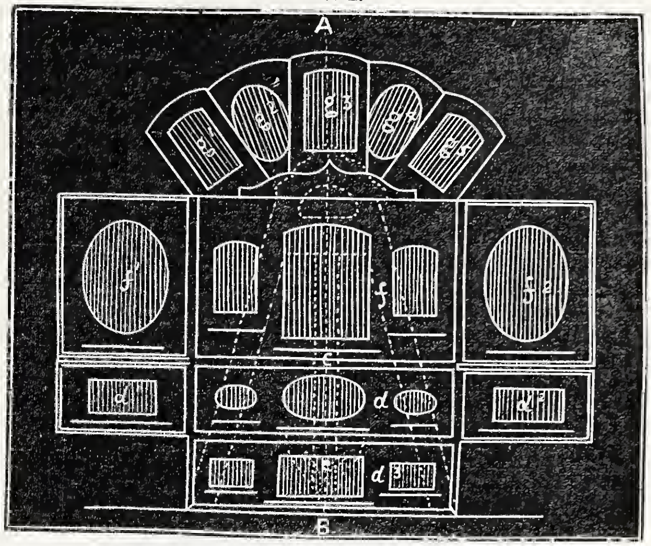
FIG. 1.



The album is of book form, and fixed on an easel *a*, to which the back cover *b* of the album is rivetted or otherwise secured. The front cover *c* drops down in a forward direction to display the pictures contained in the leaves, d^1, d^2, d^3, attached thereto, and in the leaves f, f^1, f^2, all of which open out as shown in *fig.* 2. So far the easel album is much as usual.

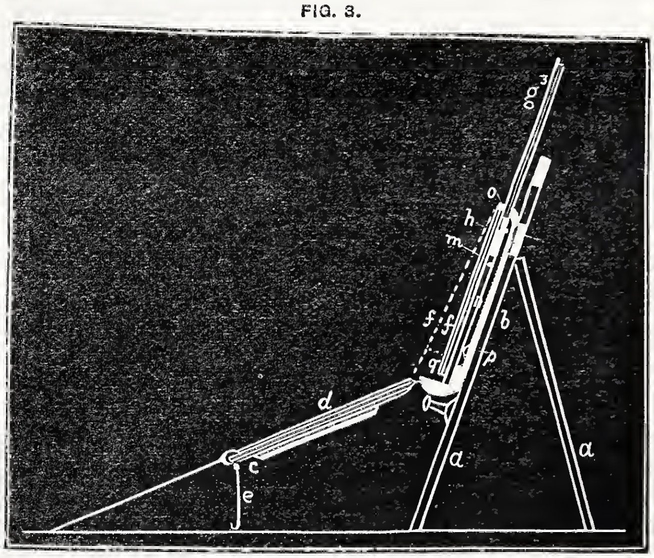
According to my invention the cover *c* is supported in the position represented in *figs.* 2 and 3 by a leg or support *e* in the form of an ornamental plate, which is hinged loosely to the clasp of the album,

FIG. 2.



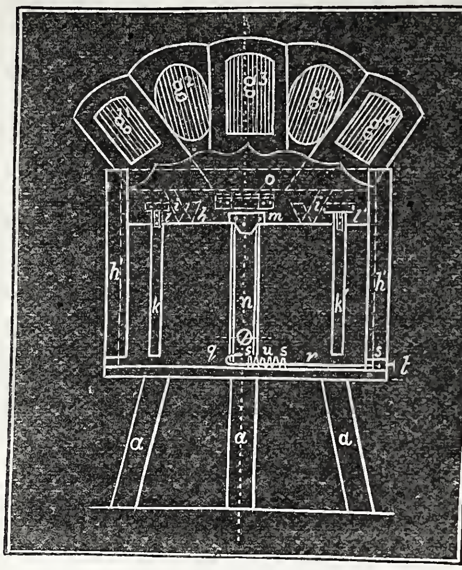
as shown in *fig.* 1, so as to assume a vertical position and stand upon the table, as shown in *fig.* 3, when the cover *c* is dropped down. g^1, g^2, g^3, g^4, g^5, are the mounts arranged in a fan-like form, and projecting above the top of the book portion of the album when in their raised position. These mounts are carried on a horizontal bar *h* fitted to slide up and down between guides h^1 at either side of

FIG. 3.



cover *b*, the said bar being also furnished with studs l, l^1, which work in slots or grooves k, k^1, lined with tin in the cover *b* and serve to retain mounts g^1, g^2, g^3, g^4, g^5, and prevent them rising too high. The middle mounts g^2, g^3, g^4, are in one and are rigidly fixed to the bar *h*, while the side ones g^1, g^5, are capable of swinging inwards towards the central mount g^3, passing in front or behind the intermediate mounts g^2, g^4. The lower edge of the side mounts g^1, g^5, which rest on the bar *h* is oblique, as shown by the dotted lines, in order that the mounts may be inclined at the proper angle, and the inner corners are rounded and roll on the bar, the mounts swinging as on a pivot, or they may be pivotted at this corner. The side mounts when drawn up free from the guides h^1 are caused to spread outwards by elastic bands *i*, by which they are connected at bottom to the bar *h*, and when the fan-shaped mounts are pushed down these side ones, g^1, g^5, are gathered inwards by the guides h^1. The bar *h* is drawn up to the position shown by an elastic band which lies in a vertical groove in the back cover *b* of the album, and is attached thereto at one end by a rivet *p*, the band passing over a pully *o* at the top of the groove, and being connected at the other end to the bar *h* by a U-shaped metal staple *m*. When the mounts *g* and bar *h* are pushed down to their lowest position, a spring bolt at the lower part of the album engages with this staple *m* in order to retain the mounts in the lowered position and keep the elastic band end stretched in readiness to cause the mounts *g* to spring up suddenly immediately the bolt is released. This bolt is a square rod *r* fitted to slide in two fixed guides, *s s*, between which, on the bolt *r*, there is a spiral spring *u* which tends to keep the hooked end *q* of the bolt engaged in the stable *m*. *t* is a knob at the other end of the bolt *r* projecting at one side of the album, as shown, and by pressing which the bolt is disengaged from the staple *m*. The leaves *f*, f^1, f^2, are attached by hinges to a plate behind them,

FIG. 4.



so that they can be raised, as indicated by the dotted lines in *fig.* 3, when photographs are to be inserted. On the outside of the front cover *c* there are glazed frames or mounts for the reception of photographs or other pictures as usual; and to facilitate the insertion of the said pictures and enable them to be readily withdrawn when desired, pockets, sheaths, or envelopes are provided in which to encase the pictures before inserting them through the slit in the frame or mounts, the said pockets having openings corresponding in shape and size to those of the frames or mounts, so as not to interfere with the view of the picture. The said pockets are made of cloth or paper and provided with tabs *x*, *fig.* 1, to facilitate the removal of both pocket and picture.

The special claims consist in the following:—

1st. In an easel album, the assemblage of fan-like mounts constructed to slide up and down in the album, and to be expanded or displayed, as shown and described, together with the means by which they are so raised and displayed, substantially as specified.

2nd. The self-setting hinged rest or support, *e*, in combination with the fall-down front cover of an easel album, substantially as and for the purpose specified.

3rd. The employment of pockets, sheaths, or envelopes provided with tabs and having openings to display the pictures for the purpose of enabling the pictures to be readily inserted in and withdrawn from the glazed frames or mounts of albums, as described.

A SENSITIVE GELATINE EMULSION PROCESS.

To give full particulars of the negatives alluded to by "Franklin" and yourselves is a difficult task, inasmuch as it is not that there is much difference in the emulsion itself as that I have to point out so many items in which great care with the materials and manipulation will, combined, secure the desired effect, viz., a very rapid negative. To such of your readers as will carry out every point faithfully to the letter I can hold out full hope of success. I shall keep nothing back, so that it will lie with them to get the same rapidity. We shall have all the materials in common excepting one, and that is the washing water.

First, then, the light. I have tried "warranted non-actinic" and "tested by spectrum analysis" glass, and can print transparencies through two thicknesses of such in about thirty minutes. Procure therefore, from a glass merchant, some of the *darkest* shade of ruby, and use two thicknesses for daylight and one for lantern. This is positively necessary, as we are to use a very powerful developer upon a very sensitive plate. If gelatine workers were careful on this point I think we should hear less of "organifiers" or "want of density" than at present. I never have any trouble on that score, because no actinic light having touched the emulsion I can apply any amount of development without any danger of fog.

To make "assurance double sure," use a ruby-coloured hock bottle, and with two eight-ounce decanter-shaped bottles made of test tube glass to stand heat—procurable at Rouch's and, doubtless, elsewhere—weigh out for a ten-ounce emulsion—

Bromide of ammonium	7 grains.
Best nitrate of silver	11 ,,
Gelatine	20 ,,
Distilled water	1 ounce.

Use Nelson's "No. 1 photographic gelatine," for with the opaque sixpenny packets you have irregularity, red fog, and frilling. Place aside four ounces of water for the bromide and two ounces for the silver; dissolve the bromide with heat in one of the test bottles in one or one and a-half ounce of water; pour into the hock bottle, swill out the test tube with the remainder of the four ounces set aside for the bromide, and also pour in. I do it by heat to ensure all being dissolved, as it does so very slowly *after* the gelatine is inserted. The four ounces of solution being now almost cold add the gelatine, shake up well, and place in two or three gallons of water at 90°. I use a fish-kettle with lid. In two hours the bromised gelatine will, after well shaking, be quite liquid, and also nearly at 90°. Now dissolve the silver in the other test bottle by heat in one ounce of water, cool to 90°, and pour in; use the remainder of the two ounces set aside for the silver to swill out, heat to 90°, and pour in. By being so particular we get regularity and are able to mix the plates of different batches, which is a great boon. Shake the emulsion very briskly and replace in the kettle for two, four, or seven days, according to rapidity required. The temperature should never be over 90°; if you do not let it exceed that you will not have red fog. "Cosy" it up with flannel, and it will not lower many degrees during the night. I, however, use a stove two feet across and place it on that; a faint gas jet below keeps it always at 90°. I shake up every twelve hours. If washed in two days the emulsion is rapid and dense; in four days more rapid and less dense—quick enough for any drop-shutter known, when developed as below. With some that I kept for seven days, with drop-shutter and dull February morning pebbles close to the camera were perfectly exposed. The negative was thin under ammonia, but bore intensifying to any extent.

Cool the emulsion in a bottle not smaller than a Winchester quart, and wrap it up in brown paper to exclude all light except the lip of the neck. Let an india-rubber tube go quite to the bottom of the bottle to stir away those layers of water which, on account of greater specific gravity by reason of the salts they now contain, would otherwise remain there. Wash for twelve hours; a dribble is sufficient. Upon melting you have eight or nine ounces of emulsion; add three-quarters of an ounce of pure alcohol, heated to 90°; fill up with water (also warm) to ten ounces, and coat. The plates should be only lukewarm, or you will have red fog. Expose a few plates with small stops—instantaneously; gradually increase the size of stop or length of time.

To develope I use for $6\frac{1}{2} \times 4\frac{3}{4}$ one ebonite tray $8\frac{1}{2} \times 6\frac{1}{2}$ for ammonia, one ditto for silver, and one 10×8 to cover over either during development to keep all light off. After soaking a minute pour the following quickly along that side of the tray which is not occupied by the plate, and by rocking the dish suddenly send it sweeping over the plate (it is developed in five to twenty seconds):—

Pyro	1 grain.
Bromide	*none.*
Pure undiluted liquid ammonia	1 to 10 drops.
Water	1 ounce.

Do not flood with pyro. first or you will render the plate slower, nor add more pyro. or you will again slow the plate and, moreover, have it too dense. If the exposure has been sufficiently short you should have a dense negative with bare glass for shadows almost as soon as the developer has covered it. A 10×8 Dallmeyer triplet, with drop-shutter, would require in good light (say) four drops of ammonia; if bad light, eight to ten drops. A six-inch single lens, in good light, would require (say) one drop; in bad light, four drops. If much ammonia be used and the plate be not developed in half-a-minute, make fresh developer and wash the plate.

Being now in possession of some extra sensitive plates, put one in a thick book, and, having placed it five or six inches from your ruby glass window or lantern, draw out the plate one-third for a few minutes; again draw it out further one third more for a short period. You will then have the film in three divisions, as it were—one portion not having been exposed to the red light and the other two portions having had different exposures. Now develope, and use (say) three drops of ammonia. If your light be still at fault the exposed portions of the plate will fog; in that case use another thickness of ruby glass.

Finally: I need scarcely wish success to those readers who desire the same rapidity as my negatives alluded to in your last issue exhibit, because success is certain, provided *no* modifications of the foregoing particulars are made. CHARLES BENNETT.

WHIMS AND FANCIES OF A LANDSCAPE PHOTOGRAPHER.

[A communication to the Bristol and West of England Amateur Photographic Association.]

LIKE all other photographers I have my whims and pet theories, and although many of my ideas may be simply "fancies," the narration of them will perhaps lead us to a discussion during which some useful remarks may be elicited. I should state that the whole of my remarks may be taken as applying to landscape work only, as several of my "whims" as applied to portraiture would need considerable modification.

Many of our members, doubtless, anticipate that my "whims and fancies" will take the form of a recital of certain pet formulæ; this, however, is not my intention, for one of my strongest whims is an utter dislike of anything like a formula. One of the great weaknesses of photographers is a blind adherence to certain formulæ instead of an intelligent appreciation and application of the principles of the photographic art. The conditions under which a landscape photographer works are so varied that the use of fixed formulæ, instead of tending to success, only leads the photographer into difficulties.

One of the most varying influences under which we work is that of temperature. At one time we may be working in an atmosphere of 90°, and at another with the thermometer at freezing point. What can be more absurd than the idea of using the same formulæ under such widely-different conditions? Take, as an example, development under such circumstances, and what would be the result? The developer that with the high temperature would cause the picture to flash out with the rapidity of lightning would under the influence of the lower temperature possibly fail to bring out any of the deep details of the picture. Yet how frequently do we hear that success depends upon using a developer containing just so many grains of iron and so many minims of acetic acid, and that the slightest variation leads to certain failure! *Apropos* of this subject I may give an anecdote which, though rather an old one, is too good an illustration of my meaning to be omitted. A certain photographer—perhaps not one of the most successful—met a brother of the art whose work was always of the highest merit and universally admired. Our unsuccessful friend does all in his power to make the acquaintance of the other, and with note-book in hand inquires how his toning is done, how his enlargements are made, and carefully notes down all particulars, asking so many questions as to become somewhat of an annoyance. At last he comes to the all-important question—"How do you mix your developer?" He receives the answer—"With brains." Out comes the note-book again—"Mem.: developer mixed with brains. Thank you; and how do you make your bath?" "With brains also." Possessing just sufficient brains to see that he was getting the worst of it our friend quietly retires. Let us hope that the lesson was not lost upon him, and that he found out that there was something more to be learned in photography than a blind adherence to a formula.

I think I have said sufficient in support of my first whim to show the necessity of varying our formulæ according to the conditions under which we are working, and that a careful study of the action of the various chemicals and a judicious application of our knowledge is more to be relied upon than a strict adherence to a mere formula.

I will now glance in succession at the various operations in the taking of a negative, giving my whims in connection with each, and attempt to give a good reason in support of each of my fancies.

First, then, let us consider the cleaning of the glass plate. Simple as the operation may seem it is one which is the groundwork of success, for with a dirty plate it is impossible to succeed. For new plates nothing can be better than the application of a mixture of alcohol and ammonia rubbed well over with a tuft of clean rag. New glass should require nothing further than this, the chief impurity which we have to remove being simply the result of greasy finger-marks. For this purpose acid is worse than useless, and instead of removing a grease-mark only makes matters worse by forming a compound more difficult of removal than the grease itself. Acid is undoubtedly useful for cleaning plates previously used; for if by chance a used plate is put aside uncleaned it will be found covered with a metallic scum, which adheres to the glass with the greatest tenacity. For the removal of such stains nothing can be better than the use of either nitric or hydrochloric acid diluted with water. Rouge and tripoli, though useful and effective as plate-cleaners, I object to, for the reason that particles are liable to adhere to the rough edges of the glass and get carried into the bath. The use of a substratum of albumen has been highly recommended, and though, doubtless, efficacious may carry injurious organic matter into the bath. For my part I am inclined to look upon albumen as an apology for cleanliness and a lazy way of getting over the trouble of plate-cleaning. Such expedients are not advisable, and are too much like putting on white gloves to hide dirty fingers, or buttoning up a vest to hide a soiled shirt front. In order to obtain the best results new glass should, as far as possible, be used, well cleaned with alcohol and ammonia, and finally polished with a perfectly clean cloth kept for this purpose only. While on the present point I may say I am particularly whimsical as to the cloth used for this purpose. If we take a cloth or towel white and spotless as it comes from the hands of the laundress, and proceed to polish a plate, we find that each stroke, instead of removing marks and streaks, only adds to the number. We may rub and polish, and polish and rub, till one's arms ache, and our plate only becomes worse and worse; in fact, instead of cleaning our plate with a *clean* cloth, we are using one impregnated with a concentrated essence of soapsuds. For this purpose I always take a so-called clean cloth and for the time being turn laundress, and thoroughly wash in repeated changes of water, finally washing it out in clean water to which is added an ounce or so of liquid ammonia.

As to collodion: there are now so many good collodions in the market that it may seem out of place to name any maker. I have tried most of the makers of repute, and have only on one occasion had a bad sample. Some makes would seem better adapted to one purpose, some to another; but for general landscape work nothing can be better than bromo-iodised collodion—Hardwich's formula. It flows evenly, gives a smooth, textureless film, which bears any amount of washing, gives a fair amount of intensity without forcing, and for half-tone and detail in the shadows nothing can be better. When slightly aged it will bear a long exposure without fogging better than most other makes. Its keeping qualities are certainly unsurpassed; and, taken for all in all, may be considered for landscape work as one of the best, if not the best, collodion in the market. In thus stating my preference for a special make I would not say one word against others; and, considering the competition and outcry for cheapness, the only wonder is that so many good collodions are to be obtained.

For landscape subjects having heavy masses of foliage or any deep shadows the addition of a grain or two of bromide of cadmium to each ounce of collodion is advisable, as it reduces the tendency to hardness in the high lights, gives detail in the shadows, and tends in all cases to give more harmonious and delicate pictures.

In no case is it advisable to use for landscape work a newly-iodised sample of collodion; as a rule, it is better for keeping until it becomes of a deep sherry colour, when it will bear a sufficiently-prolonged exposure to give all the detail, without fogging in the better-lighted portions of the picture. With a newly-iodised collodion it is almost impossible to expose a picture long enough to get *all* details without risking fog in some portion of the plate.

We doubtless lose in rapidity by using an old and ripe collodion; but rapidity is a matter of so little importance that we need not take it into consideration; in fact, unless we can work so rapidly as to get absolutely instantaneous pictures, I am decidedly of opinion that it is better to work so as to give very prolonged exposure. I should prefer an exposure of three or four minutes to three or four seconds. For running water or cascades it is usual to attempt rapid exposure. Such subjects, as a rule, being surrounded with heavy foliage or dark masses of rock, a perfectly instantaneous exposure is rarely admissible, and it is customary, as a compromise, to give an exposure too long for an instantaneous effect with the water, and too short to give proper detail and half-tone in the deeper parts of the picture. The result is usually a failure. Under such conditions I consider it preferable to prolong the exposure so as to obtain all the detail of the deepest shadows; and the running water instead of suffering will really be improved by the long exposure, the effect being more like a correct rendering of the subject than a semi-instantaneous exposure can ever give. At first sight this may appear somewhat strange, yet if we closely examine a running cascade we shall find that, although at first sight it may appear ever changing, yet there is a constant and regular succession of the same motions and the same forms; and as in gazing at a landscape containing such a subject we do not get an instantaneous impression, but an impression as given by such succession of changes, so I conclude the impression on the plate as given by a long exposure is in effect more natural and lifelike than the effect given by a semi-instantaneous exposure.

As an example I may instance the picture of *A Cascade on the East Lynn*, which, I may say, without being egotistical, is a better rendering of running water than nine out of every ten such subjects. The exposure was in this case, as far as my memory serves me, about forty or fifty minutes; yet the result is certainly natural, and gives the impression of life and motion. This picture I have shown to several experienced photographers, and it has more than once been greeted with the remark—"Of course this is instantaneous." You may judge of the surprise caused by my giving the facts of the case.

Having on a previous occasion given a paper on the negative bath, I should be needlessly taking up your time by any repetition. I may, however, state that I have taken to a fancy in discontinuing the use of distilled water for making the bath; for an examination of the distilled water as supplied by the chemists has convinced me that in many cases it contains a large amount of organic matter, and is, in point of fact, less reliable than water as supplied from the company's pipes, which I now always use for making my bath. The company's water, though it contains a considerable amount of chlorides and carbonates, is fairly free from organic matter, and I have succeeded in making a good working bath, without any preparation, by simply adding the requisite quantity of silver to the water and filtering. As a rule I keep a large glass bottle filled with water standing on a greenhouse shelf in the full sunshine; to the water is added a small quantity of nitrate of silver, which, of course, in the light precipitates the organic matter. I have thus at hand a supply of water for making up a reliable bath at a minute's notice. By acting in this way I think I could make a good working bath from ditch water.

We now come to a consideration of the developing solution. For this I prefer the double sulphate of iron and ammonia to the ordinary protosulphate, the resulting picture being richer and warmer in tone than when the latter salt is used. The reason of this is that the ammonia sulphate of iron is a more nearly neutral salt than the ordinary protosulphate, which contains a considerable quantity of free sulphuric acid. Sulphuric acid has a tendency to produce cold, grey images, as may be readily proved by preparing a developer and adding sulphuric acid instead of the acetic acid as usually added.

In practice I prepare my developer by making a strong solution of iron and adding the required quantity of acetic acid, keeping in this state and diluting as required for use. By so doing I find I get better results and richer and warmer tones than by making the developer of the required strength and afterwards adding the acid. I am inclined to think that when the acid is added to the concentrated solution some organic compound is formed which causes the developer to give the rich, warm tones I have named; when the acid is added to the dilute solution the result does not appear to be the same. On adding acid to a saturated solution of the iron small crystals are precipitated. I am not sufficiently versed in chemistry to understand the composition of these crystals, but presume them to be a modified form of acetate of iron; and it is to the substance so formed that I am inclined to ascribe the good results of a developer prepared in this manner. It will, probably, be suggested that the addition of acetate of iron will produce the same results; but, having tried developers containing acetate of iron formed by double decomposition with acetate of lead and also acetate of soda, I find they do not give the same results, being usually accompanied with a trace of fog and deposit in the shadows, whereas clearness in the shadows is one of the great points in a developer prepared as I have described.

Having during our last session given a paper on iron intensification, it will be unnecessary for me to say anything further on this point; but I may add that the past season has more than ever convinced me of the value of iron intensification.

With these few notes, hastily put together, I must close my paper, which I trust may lead to a conversation more profitable than my few remarks. My regret is that I have not been able to offer something more worthy of your consideration; but want of time prevents my devoting so much attention to the study of our art as I could desire. I am, therefore, obliged to play the part of a butterfly photographer, passing from flower to flower, and sipping the pleasures of our beautiful art-science, instead of diving more deeply into its yet untold wonders and untrodden paths. Such a course leads but to "whims and fancies," where—

"Errors, like straws, upon the surface flow;
He who would search for pearls must dive below."

E. Brightman.

THE EDUCATION OF PHOTOGRAPHERS.

Now that the idea has been mooted that the Photographic Society of Great Britain should take the initiative, and become, as it were, the parent of a school for the better education of photographers, I am desirous of adding a few remarks to a paper on this subject contained in a former publication of this Journal.

With the list of names the Society already possesses—many of them, as the outside public as well as the professional world are aware, containing some of the most prominent men in connection with photography—surely they are the best nucleus for the formation of a photographic school without the infusion of fresh blood into its ranks. But the Society states that they are hampered in starting a scheme to better educate the junior members of the art from want of funds.

The question then arises—"How are these necessary funds to be obtained?" I answer, by a general appeal to the profession, and also to amateurs, for subscriptions and donations.

It must be borne in mind that there are at the present time a great number of photographers who are not members of the above Society, yet who are, without doubt, strongly interested in the future supply of photographic labour. A direct appeal to these gentlemen and others would be scarcely fruitless, and they would, as a correspondent in the *News* of the 22nd instant remarks, be much more likely to become members of the Society if they knew that by doing so they were materially assisting in the formation of what ought really to be called a national project. Supposing even if they did not join the Society, but gave a yearly subscription or donation to a school, they would be greatly helping in a matter in which they had large interests.

Now there are several names in the list published by the Society—if the owners of them could only be induced to interest themselves—that might obtain not only the pecuniary aid of noble and distinguished amateurs, but also enlist the sympathies of royalty in behalf of a scheme which has for its main object the better education of a section of society wherein a vast amount of both capital and labour is annually employed, and which is deserving of the mutual support and assistance of the whole nation.

In conclusion: I may say that there ought to be no real difficulty in applying for monetary help from any one who is in the slightest way connected with the art of photography, and that though the formation of a school might not possibly be of any immediate advantage to them in their days, yet when "the time cometh when no man can work" they would have the pleasing recollection that they had been the direct means of assisting the wants and requirements of the new and rising generation of photographers.

George Cecil Hance.

OUR APPARATUS.

No. II.

The shutter of the dark slide should work easily, and in large cameras, more especially, be of the flexible form. This kind of shutter is of great advantage when attached to cameras for outdoor work, offering no resistance to the wind, and is not so likely to admit light or require the protection of a focussing-cloth during exposure, as in the case of the old form of sliding shutter. It is an advantage to have the back of the dark slide free—that is, not attached by hinges to the frame—in all cameras larger than whole-plate size. A 15 × 12 sized slide, for instance, having an attached shutter is an absolute nuisance, the greatest care being required to prevent it falling at unpropitious times and injuring the plate, or inflicting damage of some kind or other in the semi-gloom of the operating chamber.

The arrangement for capping the lens, especially when engaged in portraiture, is more convenient when attached to the interior of the camera than if the usual plan of a cap on the exterior of the lens be adopted. A flap secured to a rod passed through the camera above the lens with a milled-edged button at each end, one end made to screw so as to retain the flap in any position, like the sky-shade of a lens, and constructed of cardboard covered with black cloth or velvet, the weight of which will always cause it to cover the lens unless prevented by the screw-head alluded to, answers admirably, and has the advantage of not attracting attention like manipulation in front of the camera. But to return to the dark slide.

The wells usually made to catch the drainings from the plate are very little use, as the wires upon which the plate rests conducts most of the solution to the outside rebate instead of into the well. These wire supports should be just *inside* the top edges of the well to make them of any real use, as in the hurry of business it is not always possible to drain the plate as thoroughly as is necessary.

With cameras used for copying it is as well to have a few carriers made with rather broad plates at the corners instead of wires to permit odd-sized pieces of glass to be used up. This is a consideration where patent plate is used, and an economical plan. The strap or handle is frequently attached to the upper side of the camera—a bad plan, for if the camera be heavy the strain on this one side will cause it to bow outwards and interfere with the proper working of the slide, besides the danger of letting in the light. It should be carried by straps encircling it or in a case, so that the strain may be equally distributed.

As the user of a camera is supposed to exercise some sort of care over it, it should be made as light as possible consistent with rigidity, and be brass bound, which, although adding very little to the weight, adds considerably to the strength. A light waterproof cloth will be found useful to throw over it in case of sudden showers. I would suggest, when photography is carried on for amusement, that the whole-plate size should be adopted, with an arrangement for taking two cabinets on this sized plate. One lens and a movable front is better than the more cumbersome sliding back. For the professional photographer an arrangement by which any size less than the largest intended to be worked can be made in the same instrument is very convenient. A good camera should possess rigidity, ease, and smoothness in working in all its parts. A dark slide that is given to stick, and then suddenly to go in or out, is a perfect nuisance; yet how many there are of them!

Easy focussing is another matter necessary to ensure sharp pictures, and screws or racks that work steadily and evenly are a necessity. The focussing-glass must occupy exactly the same plane as the sensitive plate, and be very finely ground. Other prepared surfaces, although they may answer pretty well at first or for a special purpose, soon get scratched and stained. The advantages of finely-ground glass are that lines can be ruled upon it and obliterated at pleasure without injuring the surface. A little soap and water and a damp sponge will restore it, however dirty, to its pristine condition. In case of breakage when away from home, or where a new glass cannot be immediately supplied, a couple of pieces of tape or string tightly stretched across the screen in the place lately occupied by the ground glass will act as guides, and permit pieces of the broken glass to be used for focussing until the loss can be repaired. This plan is particularly useful to those who only take dark slides filled with plates and do the development at home, and cannot, of course, use them as temporary focussing-screens. Old screw-holes should be looked after, especially such as are left after altering a flange, and the whole apparatus should be in a sound, light-tight condition and free from dust.

Camera-stands and tripods must, of all things, be firm, and not given to vibrate by gusts of wind or slight blows of any other kind. I have not found any to supersede for real work the old-fashioned tripod with the legs formed of continuous pieces of wood; that is, not hinged or made to double for convenience of carriage. True, it is rather an unwieldy form in comparison to many ingeniously-constructed modern ones; but it has the advantage of superior rigidity and will stand an immense amount of hard work without injury, which are qualities not to be underrated. The very light ones, I have found, require such great care in use that the saving of weight is but a questionable advantage in comparison. This is a matter, however, that will be decided in most cases by the amount of muscle possessed by the photographer using it.

For the studio a heavy table stand is most pleasant to use for 10×8 pictures and upwards, and lighter ones on castors that can be readily wheeled about from place to place as may be required. A fault in many studios is that, when the table is raised to its greatest height, as in photographing a very tall person, the strain on the rack is too great, and it becomes top-heavy and unsteady in consequence. An extra thumb-screw, working in the opposite direction to the one supplied with the stand, will be found useful. A wedge driven down by the side of the rack will sometimes be advisable. A stand, or rather a table, for copying purposes should have a top not less than three feet long by eighteen inches across, with an arrangement for tilting it at either end and for lengthening it as required.

If there be a room specially devoted to copying purposes this stand should be made to travel on rails firmly fixed on the floor, to and fro from a large board or easel accurately adjusted at right angles to it, and upon which the pictures, &c., to be copied can be placed. I had a sliding table for copying purposes constructed, some nine or ten years ago, which answered its purpose admirably, and was fully described in THE BRITISH JOURNAL OF PHOTOGRAPHY at that time. It was specially constructed with regard to economy of space, the studio I then worked in being of very limited area. In copying small things a mirror laid below the picture to be copied is an advantage. A very useful addition to any copying-stand, or to cameras where several are at work simultaneously (as in interior work), is a small dial or clock face with a hand that can be set to any time, so that when the exposure is began the time is registered and there is no fear of forgetting the "how long" of the exposure, which, in protracted cases, frequently happens if other work be gone on with during the interim.

Plate-boxes are always best with V-shaped or semicircular grooves, unless for storing negatives, when very much thinner divisions than those usually made are advantageous in the matter of economy of space. If they are made of soft wood, a coat of varnish inside and out tends to cleanliness and the more easy removal of dust, which generally accumulates to a greater or lesser degree; and dust being one of the photographer's greatest enemies, any means to render it less obnoxious is to be advocated. Draining-racks are all the better for a coat of varnish occasionally applied, continued application of moisture causing the grooving to warp and leave the framework, which, although not absolutely rendering them useless, is still unsightly, and when the remedy is so easily applied should always be done. E. DUNMORE.

ON PERSPECTIVE.

I FEEL impelled to make a few remarks on a subject which has lately occupied the attention of photographers at the meetings of some of the societies—the perspective representation of objects. It is an old hobby of mine, and one which, when an art-student, I studied practically and mathematically with some amount of success. Mr. Cocking read a very interesting paper grounded on thoroughly correct principles; but it is a little unfortunate that in his desire, I dare say, to be understood by all his hearers—even those not hitherto conversant with the subject—he has used his scientific terms rather loosely, and has mixed up perpendiculars, verticals, and horizontals in a rather vague manner.

In perspective representation, as recognised by artists, there are some points which Mr. Cocking also did not make clear—such, for instance, as that in depicting a given view it is assumed not only that all the objects in it are stationary but also that the eye itself is supposed to be rigid and immovable, one only being assumed to be employed. I will now point out some further principles of pictorial representation.

Between the eye and the view a supposititious plane of glass is set up perpendicular to the axis of the eye; and, as nature is generally viewed with the eyes looking straightforward with the body erect, it will follow that this plate of glass would usually be vertical. Upon this glass lines are drawn corresponding with the appearance of lines in the view, so that, in fact, the lines when drawn on glass hide those of nature. This plate is usually termed the "plane of delineation." There are various rules made use of in such drawings by means of which, when we know the distance of objects and their size and the angle their lines make with the plane—if it be possible to make a drawing whose lines would, if transferred to the plane, exactly coincide with those of nature—a modern photographic lens of suitable focus would give an exactly similar picture. Hence I may say that a correct perspective picture is one when placed at a certain distance from the eye, must produce upon the eye exactly the same impression as the original view would, so far as regards form; but the instant it is placed too far from or too near to the eye, or at an angle other than a right angle to the axis of the eye, it ceases to produce a correct impression.

With regard to Mr. Sawyer's contention, which I shrewdly suspect to hide some paradox, it is pure question of observation in the converging or non-converging of certain lines. It has been settled long ago that if the eye be looking straight out—that is, its axis parallel to the earth, the plane of delineation then being vertical—all parallel lines (whether vertical, horizontal, or slanting) which are parallel to the plane—or, in other words, situated in a plane perpendicular to the axis of the eye—will be parallel when drawn on the plane or when photographed in a levelled camera (the axis of the lens being perpendicular to the film). The parallel lines suggested by Mr. Sawyer fall in this category, and must undoubtedly be photographed as parallel lines if, and only if, the camera be levelled and the lens at a true right angle to the ground glass. This has been proved long since by artists and opticians.

I cannot but think Mr. Sawyer has some clever paradox at the bottom of his assertion. Taking him *au serieux*, it would follow that, if in addition to the vertical lines he names he would draw two horizontal lines across them at such a distance as to include a true square, this square, as its sides are stated to narrow as they are removed from the centre, would come out in the photograph as barrel-shaped—the old distortion that opticians have long ago banished. If Mr. Sawyer were to copy a map in (say) such a manner his clients would very soon return it upon his hands.

In connection with this subject it may be very easily confused by reference to the human eye itself, which is not achromatic, and which is subject to errors of spherical aberration; but it must be remembered that whatever effect is produced on the eye by the parallel lines of nature will also be produced by the smaller parallel lines of the reproduction. Hence we cannot be allowed to distort the lines of our pictures on the excuse that that is how they are seen by the eye; for, if we do this, the already-distorted lines would become still more distorted when viewed.

The moment, however, the eye changes its position, and is directed upwards towards the top of the chimney or map, its axis is not at a right angle to the vertical lines of nature, and a tracing upon the plane of delineation of a chimney or tower so seen, or a view from the camera, would give converging vertical parallel lines.

Captain Abney was as lucid as he was brief in his exposition of the relation of focal distance to truthfulness of representation; but he fell into an error (if he be correctly reported) when he said that vertical lines in a picture taken by a short-focus lens would appear parallel at one distance, but converging when seen from the focal distance. Apart from the aberration of the eye I named—and it exists for any distance or focus—such lines would always appear parallel.

Mr. Sawyer, Mr. Woodbury, and Mr. Davis in the discussion all took the same view, viz., that vertical parallel lines would and should converge, on the ground that the angle subtended by a section of their upper part would be less than that subtended by the part opposite the eye. For a moment putting aside the fact that their assertion has been long since proved both in practice and in theory to be incorrect, it can very easily be shown how they have arrived at a wrong conclusion from correct premisses.

It is true that the top of a tower appears to subtend a smaller angle than that part which is opposite the eye; but the draughtsman's or the photographer's copy of it has also exactly the same effect upon the eye when it is drawn parallel. If, to meet these gentlemen's views, we draw the tower with a narrow top, when we look at it from a point relatively the same as the original was viewed from the top of the tower in the drawing being further from the eye will appear still more diminished to an absurd extent. And in the camera it must be remembered that the expanding beam of rays has further to travel from the centre of the lens to the edge of the plate than to the middle, and hence in the former it has the opportunity of spreading out far enough to preserve the parallelism. All such errors as these would be prevented by accepting the definition I ventured to propose—that a linear perspective picture is one which, as regards form or outline, has the same effect upon the eye as the original objects themselves.

G. Watmough Webster, F.C.S.

THE REACTIONS OF CHROMIC ACID AND CHROMATES UPON SUBSTANCES OF ORGANIC ORIGIN, CONSIDERED WITH REFERENCE TO THEIR USES IN PHOTOGRAPHY.

The photographic chromate processes, to which little attention was paid at first, in course of time attained an unexpected importance. From day to day, from year to year, the interest in these processes increased; and as their influence on art and science increased so did the literature devoted to chromate photography—that is, to the chromates regarded as producers of pictures—swell in bulk.

The attention of chemists and of artists having been thus directed to the subject, the difficulty of condensing what is really known began to be experienced; and, though from the fact of several establishments for working the process having been set moving, the difficulty seems to have been more or less solved by the latter class. Still the photochemist has a difficult task in studying how to arrive at a clear view of the subject, owing to the number of branches into which it is split up, and the defective and contradictory opinions expressed on many points.

In the present paper I have tried to map out the fundamental points of photography by means of chromates, both from the theoretical and practical view of the question. Though I have separated the important from the unimportant, still I have had to take note of small, apparently trifling, variations in the behaviour of the reagents, because, in photography, more almost than in any other case, inconsiderable causes produce great results. On the other hand, in treating of cognate circumstances it is not easy to draw the line between fundamental facts in the chemistry of chromate photography and unimportant practical details, which last should find no place in this paper. As I wished to make a critical study of the former, and thus had to take a sort of general standpoint, I held aloof as far as possible from special formulæ, but to facilitate the comparison of the views of different authors I have given exact reference to the passages alluded to, so as to make a study of the details of the subject treated under each head much easier.

Besides independent experiments, it seemed to me that a careful experimental repetition, and a thorough sifting of the materials already accumulated by the observations of others, would be of value in acquiring a rational basis for photography with the chromates. I have repeated the greater part of the experiments cited, even when I do not expressly mention the fact, and have only put the name of the person whose observation agreed with mine in the text.

By a searching investigation of the subject I found myself in a position to get a clear view of the present state of chromate photography, in so far as regards its photo-chemical aspect, and, as I hope also, to impart it to others. I worked out an analysis of the often contradictory opinions of the different experimentalists without suppressing the opposing views, as the only way in which they could be utilised. In doing this I had to try to mould into one well-organised and well-fitting-together whole the more than five hundred original statements made by various authors, and which I had myself verified. In this work I derived considerable assistance from the kindness with which Dr. E. Hornig placed a great quantity of photographic literature at my disposal, while Captain V. Tóth made many of the photographic experiments along with me. The chemical analytical experiments were carried out in the laboratory of Professor J. J. Pohl, in the technical High School of Vienna. I have also the agreeable duty of expressing my thanks here to the gentlemen on the committee which awarded the prize to my essay for the valuable hints they gave me for the better rounding off of the present paper.

Introduction.

The question as to what is the action of chromic acid and its salts upon gelatine, albumen, gum, sugar, and so on, either by themselves or with the combined action of light, heat, or other agents, is very difficult to answer. The difficulty of obtaining chemical control over that action is very much increased by the chemical composition of the above-named organic substances being uncertain; and the products of their decomposition by the less energetic reagents, to the number of which those belong that are treated of in this paper, in consequence of the slightly characterised form in which they appear, are difficult to grasp as chemical individuals. But though no very exact conclusion can be arrived at as to the chemical constitution of the products of these reactions, still from the course of the reaction and the properties of the resulting substances we can give some explanation of the composition, so that from the practical photographer we obtain assistance for the chemist, and the latter, in turn, assists applied photography.

The property of the chromates of being reduced by many organic substances only under the influence of light has attained great importance in practical photography. The methods of producing light pictures by chromates are divided sharply into two groups, when the part played by the different products of the reaction in the formation of the photographic image is used as the cause of separation.

To the *first group* of photographic processes with chromates those pictures belong in which the image is formed by the chromate itself decomposed by light. Ponton* was the first to obtain a negative picture in this way, by exposing to the light, under a drawing, a paper saturated with potassic bichromate. The light picture produced is of a dull pale brown colour, and consists of hydrate of chromous chromic oxide. The paper reduced to ashes contains chromous oxide. The brownish-yellow colour of the image, its subsequent darkening to green when treated with ammonia, which extracts small quantities of chromic hydrate, while chromous oxide is left behind, confirms the assumption that hydrate of chromous chromic oxide is present. Thus the contents of the last-named substance correspond to the existence of such a picture, and so I shall in this place mention the properties—in so far as they concern our purpose—of hydrate of chromous chromic oxide, which plays an important part in all later processes. It is formed as a brown powder, of very little stability, by the de-oxidation of chromic hydrate, by sulphurous acid, by heating, alone or with chromous oxide†, and by the precipitation of chrome alum with potassic bichromate‡. Acids and alkalies decompose it into chromic hydrate and chromous oxide, and even long washing with distilled water is sufficient to cause the gradual but complete removal of the chromic hydrate, leaving the

* *Dingler's Polytec. Journal*, vol. 74, page 68. Compare also with Bierstadt's account of the story of the chromate printing process, *Photo. News*, 1875, pp. 398, 413, 435, and 449.

† Maus. *Poggendorf's Annalen*, vol. ix., p. 127.

‡ Elliot and Storer. *Jahrber Chem.*, 1861, p. 251.

chromous oxide behind. Chalky spring water accelerates this separation very much.

The pale colour of the chromium pictures can be deepened by various means. Lead, silver, and mercuric salts give a yellow colour*, and for many dyestuffs hydrate of chromous chromic oxide acts as a mordant†; for example, for alizarine, logwood, and fustic. Coloured pictures‡ belong to this class. According to Hunt§ and Burnett‖ cupric bichromate gives denser pictures upon paper than potassic bichromate, because the picture then consists of a mixture of hydrate of chromous chromic oxide and basic cupric chromate. The presence of the latter is explained by the decomposition of part of the chromic hydrate by light, by which the insoluble basic copper salt is produced.

Such cupric chromate pictures can be coloured a reddish-brown by ferricyanide of potassium.¶ Nickelous bichromate behaves in the same manner; also the Willis'** aniline printing method, which was improved by Vogel,†† may be included here. These methods have neither practical nor theoretical interest; it is sufficient to have named them.

The *second group* of photographic processes in which chromates are used is of far greater importance. These are based upon the property of chromates of rendering certain organic substances insoluble through the action of light, or of wholly transforming them, so that it is no longer the chromous oxide alone, but the organic substance changed by the light, that forms the image.

We have now to find out in what way the action of the chromates proceeds, of what the organic substances changed by the light consist, and how far the chromous oxide produced contributes to the formation of the photographic image. The prevailing idea, which can be traced back to Swan,‡‡ is that the picture-producing organic substance contains chromous oxide as an integral component, and that the picture is first produced by the chromous oxide in a secondary reaction. Whether this view, which is supported by some experiments of Swan's, be correct, or whether the other idea—that the chromate light picture is formed by the oxidised organic substances—as is pronounced by Lemling§§ and Liesegang‖‖ to be the case, was not decided, and upon the basis of existing observations cannot be stated with certainty.

In studying the behaviour of the various organic substances used in chromate photography with the reagents and with light, I have tried to solve the question. J. M. Eder, M.D.

—*Photographische Correspondenz.*

(To be continued.)

FOREIGN NOTES AND NEWS.

Durable Paper for *Bombé* Pictures.

In the *Photographisches Wochenblatt* Herr Fritz Haugk gives directions how to prepare durable paper for *glacé* or enamelled pictures:—Take some good albumenised paper and float it as usual on a one-to-ten silver bath. When the paper has floated long enough, which will be in about two minutes, lift it slowly up and draw it backwards over the edge of the bath, and lay it between sheets of clean blotting-paper, so that when looked at from the side it will have a perfectly equal but somewhat dull appearance, quite free from any shining, marble-like marks. In this half-dry condition the paper is laid, film side undermost, upon a bath containing—

Water	400 cubic centimetres,
Gelatine	5 or 6 grammes,
Chloride of sodium	5 ,,

and, being repeatedly lifted up and laid down again, it is allowed to float until the gelatine film formed adheres closely and equally to the albumenised silvered film. The paper is then dried at a gentle heat and is ready for use.

Paper prepared in this way, it is said, will keep as long as washed silvered paper. Like the latter also it requires to be fumed with ammonia, after which it is treated like albumenised paper silvered in the ordinary way. Care must be taken not to wash off the gelatine covering, to prevent which it is advisable to keep the pictures printed on gelatine paper separate from the prints on ordinary paper, and to use the chemicals and washing water rather cold. The water used for washing must also be perfectly free from dust or dirt, as the particles would be apt to settle on the softened gelatine.

The proportions given for the gelatine solution should also be adhered to, as, if more gelatine were added, the film would be thicker and would swell up and so be easily injured. The quantity of salt should not be increased either; as, when there is a great amount of salt present—even when the paper is well fumed—the prints are flat; indeed, the quantity of salt might with advantage be lessened. If it be wished to use the same gelatine solution several times it must be stored in the dark after each time of using, because it contains a little chloride of silver in solution.

Prints which do not require to be spotted may be placed upon the collodionised glass immediately after the last washing. A two-per-cent. collodion is used, and when it has dripped sufficiently the plate is laid in a vessel containing water until the water runs clean off. The prints adhere easily, and, with a little care, quite free from air-bubbles, to the collodion film; but, even if a few air-bubbles should be formed, they are easily removed by a slight pressure with the squeegee.

To mount the pictures: let the print dry for five or ten minutes upon the collodionised glass. Then paste the back of it with some fresh paste to which a little gelatine has been added; lay the cardboard (which has previously been moistened for a short time in water and then dried with a towel) upon it, and smooth it down with the wooden back of the squeegee. When the card sticks fast to the print leave the whole to dry spontaneously. When perfectly dry push the point of a knife between one corner of the print and the glass, and the former will spring off.

With regard to pictures which require to be spotted, these should not be placed on the collodionised plate directly they are taken from the last washing water, but must be dried. To dry them Herr Haugk recommends rather a peculiar plan. He sticks them, film side outwards, against a door which has been oil painted, and when they are half dry and fall off he spreads them out on a table to become perfectly dry. The spotting presents no difficulties, as the indian ink adheres well to the gelatine film, and had better be rubbed down in a very thin solution of gelatine. When the ink is dry place the prints in water for a few minutes and then finish as above.

* Kopp. *Polytech. Centr. Bl.*, 1865, p. 187.

† Compare Schnauss, *Phot. Lexicon*, 1864, p. 393; Lemling, *Der Forscher*, 1867, pp. 83, 127, 148; Heinlein, *Photographicon*, Leipzig, 1864, p. 296; and for potassic bichromate as a mordant, *Dingler's Polytech. Jour.*, vol. 220, p. 192.

‡ Salts of chromous oxide are recommended in dyeing as a mordant for indigo, catechu, &c. (*Polytech. Centr. Bl.*, 1874, p. 469.)

§ *Dingler's Polytech. Journal*, vol. xc., p. 413.

‖ Horn. *Photo. Journal*, vol. viii., p. 69.

¶ *Dingler's Polytech. Journal*, vol. 182, p. 148.

** *Photo. Mittheilungen*, vol. iii., p. 15. †† Vogel. *Lehrbuch der Photographie*, 1874, p. 41.

‡‡ *Photograph. Mittheilungen*, vol iv., p. 207.

§§ *Freund des Photographen*, 1875, p. 105. *Photoverrotypie*, 1874, p. 21.

‖‖ *Phot. Arch.*, vol. vi., p. 102.

Our Editorial Table.

The Forge and Lathe—The Turner's Manual.

London: F. Offen, 3, York Street, Covent Garden.

Commencing its existence, under the skilful editorial supervision of Mr. D. A. Aird, as the *Turner's Manual*, this favourite fortnightly periodical, which is devoted to the requirements of the engineer, mechanic, and artisan, ere it has completed its first yearly volume has undergone a change of a twofold character, namely, of title (in a modified sense at least) and, what is of more importance to those who will bind the numbers, in dimensions. The numbers already issued prove the work to be one of great value, several of the regular contributors—to wit, Mr. Aird, Mr. J. H. Evans, the author of *The Lathe and its Uses*, and others—being recognised as amateur or professional mechanicians of the highest reputation for theoretical acumen and practical skill. Up to this the last number issued the work has been profusely illustrated by means of wood engraving, lithography, chromo-lithography, and photography. The *Forge and Lathe* is intended for a high class of readers, and there is no doubt it will secure the suffrages of such. We should not omit to state that the reproduction of M. Bergeron's valuable work, translated by Mr. Aird, forms an attractive supplement to each number.

The University Magazine.

London: Hurst and Blackett.

For the "advanced" character of its articles, and the beauty of the illustrative photograph of the new series of contemporary portraits, the *University Magazine* still ably maintains the high position it has taken since the recent change of management. The current number contains a varied series of articles—one of them, "The Other Half," being a contribution of great value and interest to the student of the science of "soul." Not less interesting is the "Home-side of a Scientific Mind," and Mr. Conder's "Religious Imagination in the East." The biographical sketch in this number is that of Professor Owen, C.B., F.R.S., &c., who, it is well-known, is Superintendent of the Department of Natural History in the British Museum. The portrait, which is printed in excellent style by the Woodbury mechanical process, is from a negative by Messrs. Lock and Whitfield, of Regent-street, and is exceedingly characteristic. The keen, thoughtful look of the venerable *savant* (for he is nearly seventy-four years of age) is admirably depicted.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 1	West Riding of Yorkshire	Oddfellows' Hall, Thornton-road.
„ 1	Benevolent Association	160a, Aldersgate-street.
„ 2	Great Britain	5a, Pall Mall East.
„ 3	Edinburgh	5, St. Andrew-square.
„ 3	Bristol & W. of England Amateur	Museum, Queen's-road.
„ 4	South London	John-street, Adelphi.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

THIS Society met on the 18th January,—Dr. Vogel occupying the chair as usual. The ordinary routine business having been despatched,

The President read a letter from Herr Strumper, of Hamburg, in which the latter said he thought it quite possible under certain circumstances to get an impression from a lichtdruck. The letter was accompanied by a perfectly-successful print reproduced by Herr Strumper from a linear illustration from a publication.

Herr JACOBI explained that it depended almost entirely on the composition of the ink with which the lichtdruck was printed whether one could get another print from it or not. A lichtdruck might, however, be very well printed with *rather* fatty ink. Pictures in half-tones were not, he thought, very suitable for reproduction in this manner.

Herr Obernetter had sent a series of very successful prints in colours of views of the walls of Nürnberg. The prints in each separate colour, which had served to produce the pictures, were very instructive. In a communication which accompanied the prints Herr Obernetter said he used different reproduced negatives, made by his dusting-on process, for the various colours. The negative for blue is exposed with a weak chromium solution and slightly dusted on. For yellow the same film serves, but long prepared and strongly dusted on. For violet an ordinary negative, in which the green is covered over, is used. The plate for red is also prepared by stopping out. Herr Obernetter likewise uses a print from sepia, which gives power and outline to the whole.

The President then read a letter from Herr Oscar Kramer, in which he said that Winter's imitation Gobelin tapestry is photographed directly upon linen and then painted over, and is not treated in the way mentioned at the meeting of November 16th.

Herr Schaarwächter laid on the table the reply he had received to his petition on the misuse of medals at exhibitions.

Herr Fechner exhibited his design for the diploma of membership of the Association. The design was greatly approved, and it was resolved to have 500 copies printed by lichtdruck.

A communication from Herr Winter, of Flaville, was then read, from which it appeared that, in consequence of an advertisement (a copy of which accompanied the letter) appearing in a technical journal, the writer had been induced to send two negatives to Herr Pfeiffer, of Guben, to be enlarged, and had in return got the two enlargements which he laid upon the table, and for which he had had to pay twelve shillings; but the pictures sent in no way corresponded to the promise made in the advertisement. This view was confirmed by those members of the Society who examined the enlargements.

The President then exhibited a piece of French oiled silk which he used as a dark-room window, and also some plates varnished with chrysoïdine, and announced that he had been astonished to find that the pale yellow oiled silk prevented the chemical action of light much better than the deep red-yellow chrysoïdine varnish. He also showed a one-to-twelve solution of bichromate of potassium which, in a film only one centimetre thick, in spite of its pale colour, kept out blue light excellently.

The following question was then put:—"In speaking of Albert's chromophotographs, the *Mittheilungen* says that Albert works with three plates taken from nature and sensitive to different colours, and the negative upon which *red* has *not* acted furnishes a lichtdruck plate for *red*, and the same in the case of blue and yellow negatives. In the *Photographisches Correspondenz* the contrary is held to be the case. It is there said that the negative *upon which red has acted* furnishes the lichtdruck plate for *red*. And the same holds good for blue and yellow. —Which is right?"

Herr QUIDDE said the *Correspondenz* was wrong, owing, probably, to the accidental omission of the *not*.

The same person asked how Herr Obernetter would prepare a lichtdruck plate for blue from an ordinary negative. The explanation given was that he would cover every part not intended to be blue with a perfectly opaque varnish, beside which the blue parts, which were formerly opaque, would appear comparatively transparent, and with a long exposure would give powerful prints. Another member asked how he was to photograph oil paintings without reflection from the face and other light parts; and Herr Reméle gave an account of his journey to Fez, which was listened to with great attention.

The meeting was immediately afterwards adjourned.

THE PHOTOGRAPHIC SECTION OF THE AMERICAN INSTITUTE.

AT the November meeting of this Section, Mr. H. J. Newton, President, occupied the chair.

Mr. O. G. MASON (Secretary) said that he intended to say something on the new application of carbon; but he saw a gentleman present who was a practical carbon worker, and who also had some specimens of the latest work in that line. He would, therefore, prefer to listen to his views on the subject, and called upon Mr. Bierstadt.

Mr. EDWARD BIERSTADT, in answer, exhibited some specimens of coloured photographs, which he said were made in a peculiar manner. They were printed by the Albertype process, from three different plates of each subject. He had seen published, something like a year ago, an article by an Englishman who proposed to make similar negatives by allowing the light from the object to pass through a prism, by which the light from the object would be analysed; and thus the blue, the yellow, and the red rays would each make a different negative, and by printing the three colours over each other we have the effect here produced. It is a very simple process. Of course, in yellow and red light the exposure would require to be at least one hundred-fold more than in the blue light. Workers in the process wanted to hold it as a secret; and it was only by his reading of it in the foreign journals, and his correspondence with parties in Europe, that he had obtained reliable information upon the subject. M. Albert, of Munich, wrote to him, and gave him a description of the process. He promised him (Mr. Bierstadt) that if he would make three negatives as he should direct, and send them to him, he would return a print from them showing the objects in their natural colours. The print was not made from the original negative. He found it to be necessary to pass the light through some medium to analyse the colour. The light that was not wanted had to be filtered out by some means. The prism had been suggested as the best for the purpose.

The PRESIDENT inquired if coloured glass placed in front of the lens would not have the desired effect, or could it not be secured by using coloured lenses.

Mr. BIERSTADT thought that the use of coloured lenses would be rather an expensive process. Coloured glass seemed to answer well enough. A writer in THE BRITSH JOURNAL OF PHOTOGRAPHY, about a year ago, suggested the use of the prism.

The PRESIDENT remarked that when coloured glass was interposed the light coming from the coloured object was compounded, whereas if a prism were used it would not be.

Mr. BIERSTADT said that scientific men whom he had consulted told him quite differently. He was trying some very interesting experiments in this line which, if successful, he would bring before the Section.

The PRESIDENT stated that in photographing red the image on the glass would be brown, but if blue glass were used it would not present that tint. The subject of photographing in colours was exceedingly interesting, and they would be highly pleased if Mr. Bierstadt would show them something further at the next meeting. He had great faith in Mr. Bierstadt's ingenuity, and had no doubt but that he would succeed.

Mr. BIERSTADT remarked that in the process used for producing the prints exhibited three negatives were used. In one portion of the specimen was shown what was effected by the different lights—yellow, blue, blue and yellow printed together and red, and in the remainder of the strip the effect of the whole three were combined. Those, they were told, were the three primary colours. They had the full force of the three colours printed on each other. The lines were very sharp. Lithographers could not produce so fine lines as those.

The SCRETARY said that according to this system, as they understood it, combined with the Albertype, anything could be photographed and produced in the natural colours by using three negatives. It was not like the chromos. which Prang made, where twenty different stones had to be used upon one print. But here they had the effect of twenty stones with three colours. This was an immense step in the application of photography to the illustration of nature. It would be remembered that at two or three of their recent meetings the subject of blue glass was much spoken of. He incidentally heard Mr. Chisholm make some statements in regard to making pictures with coloured glass. He would like that gentleman to state to the meeting his experience in that line.

Mr. JAMES CHISHOLM said that the idea was suggested to him while crossing the Brooklyn Ferry. He observed, on looking through the blue glass windows of the cabin of the steamboat at a building on which the sun was shining, that the blue glass neutralised the colours of the building; so he procured fine specimens of blue, pink, and other coloured glass, He found that when the glass was put on the outside of the lenses it required very long exposure. He also procured from Mr. Currier some of his more bedaubed coloured lithographs, and found that the blue glass neutralised the colours on them. When he placed the glass between the two lenses it produced the effect in much less time than when placed outside of the lenses. He had the most objectionable colours, and he found they could be photographed much better with than without the glass. He could not do anything with white glass on the different colours; the blue glass neutralised them.

The PRESIDENT remarked that very beautifully-coloured glass could be made with aniline blue in varnish or collodion. Iodine gave an orange colour.

Mr. J. B. Gardner said that he used a method different from any here spoken of, and that was to have a place in the light to open, something like a fan-light window over a door; and the light that came through that was made to pass through coloured glass before reaching the object under treatment. By that plan he would work quicker than by any other he knew.

The President remarked that Mr. Gardner's method would only answer for indoor work; for landscape work, of course, it would not do.

The Secretary stated that in using the microscope he had it so arranged that he could drop into a receptacle in the sub-stage a piece of coloured glass, and he found that by passing the light through that coloured glass he could see objects that were completely invisible without its use. It was extremely interesting to him to examine the effect so produced. He found blue glass to answer his purpose best in a great number of cases.

The proceedings then terminated.

Correspondence.

CHLORIDE OF SILVER.

To the Editors.

Gentlemen,—I notice that Mr. M. Carey Lea, in the third paragraph of his communication of last week, is under the impression that the late Mr. Sutton was able to utilise the developable property of silver chloride by means of the alkaline developer. Now, while Mr. Sutton was certainly a great advocate for the theoretical sensitiveness—if I may so call it—of silver chloride, I am not aware that he ever was able to produce practical images, or that, indeed, his trials resulted in anything more than a mass of fog, the silver being reduced all over the plate.

As far as I remember, Mr. William Robinson was the first to state the possibility of obtaining thin images with silver chloride, which he did in a communication to this Journal on *The Sensitiveness of Iodide of Silver*. I then took up the matter in the autumn of 1874, and now perfectly remember the exultation with which I first looked upon a clean chloride negative of great intensity. The gelatine film, in which was formed the silver chloride by means of the nitrate bath, had become loosened during the final operations; and, as it hung in folds, like a wet blanket, from a corner of the plate (gelatine workers know the appearance only too well), it was no mean type of the failures in store for me in the future.

However, at the time I was sufficiently delighted, and set to work making an emulsion. This I did with gelatine, and I naturally promised myself a high degree of sensitiveness; but, in spite of my "best-laid schemes," "horn silver" refused to lift up its horn and assert its superiority over silver bromide, and to this day something of mystery hangs over the *untheoretical* obtuseness of silver chloride.

Mr. Lea, as the discoverer of so many good things in photography, will naturally understand and, I hope, excuse my desire to retain my claim (if just it be) to at least a share in the practical utilisation of silver chloride with alkaline development.

I also hope that others will not misconstrue my object in writing this letter. It is not for the credit of having suggested the possibility of using silver chloride as a substitute for silver bromide that I contend; but that Mr. William Robinson was the first to publish the practicability of obtaining an image—feeble, no doubt, and somewhat foggy I suppose; and, secondly, that I was the first to publish a means whereby silver chloride, by the use of either bath or emulsion, could be made to produce both dense and clean images.—I am, yours, &c.,

31, *Grove Place, Brompton, S. W.* Herbert B. Berkeley.
March 26, 1878.

VOIGTLANDER'S NEW LENS.

To the Editors.

Gentlemen,—Permit me to trouble you with an extract from a letter I have received from Mr. Voigtlander in reply to that of Messrs. Murray and Heath, which appeared in your Journal of the 8th instant. Mr. Voigtlander writes:—

"Messrs. Murray and Heath use words which approach to a personal injury, and do me an injustice. Should these gentlemen, therefore, continue in the use of the language of invective I say at once that I value myself too much to follow them in such a course, and to attacks and suspicions of that kind I shall merely oppose silence; indeed, the reproach of an *imitation* should be more seriously reflected upon before being made in such a brusque and public way.

"If Messrs. Murray and Heath believe they have found in my euryscopic lens an imitation, in so far as Mr. Steinheil's aplanatic lens (the merits of which are certainly recognised by me as much as they are by all persons occupied with photography) is composed, like the euryscopic lens, of two flint glasses, and that the diaphragms are placed in the middle of both systems—such assertion will at once appear frail and vain to persons acquainted with the laws of optics and the construction of lenses.

"It is certainly no business of mine to explain to a critic the difference of the optical effects of the lenses in question; but if Messrs. Murray and Heath wish to have any information in this respect I beg to draw their attention to tests and trials of Professor Dr. Vogel, President of the Berlin Photographic Society, and of Herren Prümm and Schaarwächter, who made comparative experiments, and whose experiences are published in the *Photographische Mittheilungen* of May and June, 1877. Further information respecting the euryscopic lens may be found in the Vienna *Photographische Correspondez*, No. 159, and the *Revue Photographique*, by Professor De Vylder, Brussels, July, 1877.

"There is still another point to which I do not fail to direct Messrs. Murray and Heath, and that is the long-standing acquaintance with, and respect of, my house for the firm of Mr. Steinheil, which seems to be unknown to them, but which I greatly value; consequently, such an act as that cited by Messrs. Murray and Heath is precluded.

"I deeply regret that Messrs. Murray and Heath—perhaps guided by a natural interest for Mr. Steinheil—have forgotten themselves so far as to be transported to utterances which only give evidence of a superficial knowledge of the matter."

—I am, yours, &c., Richd. W. Thomas,
10, *Pall Mall, March* 25, 1878. *Agent for Voigtlander and Son.*

NON-CONVERGING PERPENDICULARS.

To the Editors.

Gentlemen,—I was much interested in your report of the discussion at the meeting of the Photographic Society of Great Britain in your last number, and I do not think that even Mr. Sawyer can contradict the following mathematical statement:—

In looking at a drawing the eye should be removed from it exactly to a distance equal to the length of the "point of distance," or at a photograph to a distance the same as the focus of the lens by which it was taken.

If this be done objects—such as high buildings—will appear in their correct propertion when represented by non-convergent (parallel) lines; for the relative distance from the camera of any objects in the same plane as the original is directly proportional to the relative distance of their representations in the picture from the eye. Hence pictures taken with long-focus lenses satisfy the eye, while those taken by wide-angle and short-focus lenses often do not.—I am, yours, &c.,

Liverpool, March 27, 1878. W. Horseman Kirkby.

To the Editors.

Gentlemen,—In glancing over your report of the discussion that followed the reading of Mr. E. Cocking's paper on *Non-Converging Perpendiculars in Architectural Photographs*, I was rather amused, nay astonished, at the ideas expressed by some of our "big guns" with respect to this very simple question, and I think I will be able to show wherein they are mistaken; but, in order to do this, I will have to take one by one the arguments of Mr. J. R. Sawyer—one of the chief opponents to Mr. Cocking's theory.

Mr. Sawyer says:—"If you take your stand at the bottom of a street and look down it you notice that the sides gradually approach until they come to converging point." To this I answer—"correct;" and, further on, will show the reason why. The report goes on to say:—"He carried that reasoning further, and held that if you stood at the foot of a tower and looked upwards you saw also the lines of the tower recede from the eye until they also came together." Again I say "correct," and for the same reason as above. But Mr. Sawyer also says:—"Now supposing the tower was 200 feet high, and the camera be placed at such a distance as that the whole be brought into the field of view covered by the lens, he maintained that supposing the lines were vertical, the camera being further from the top than from the bottom, the lines as presented by the camera must necessarily converge." To this I must reply that if the camera be set quite level the lines will *not* converge, and, by a single experiment, which I shall point out, Mr. Sawyer may convince himself of his error; or, if he even take his own, by which he proposed to decide the question (I refer now to the sheet of paper on the wall), if carried out as he stated at the meeting, he will at the end acknowledge his mistake.

There appears to have been several members of opinion that because the top of a tower was farther from the eye than the bottom the vertical lines must necessarily converge; but any one who has had experience in photographing architectural subjects, or copying engravings or plans, knows that this mistake occurs through not having the camera at right angles with the object to be photographed, and that any departure from a right angle gives more or less an oblique view, consequently more or less convergence.

Now for the experiment to prove all this. Get a long, level, and parallel table; at one end place a drawing-board, perpendicular and at right angles with the table top and also with the edges; upon the board draw parallel lines to show the sides of a tower, and of any height that may be convenient so that it represents a high tower; now place the camera on the table anywhere, only let it be sufficiently back from the drawing to show on the focussing-screen the full height of the tower, and note accurately its appearance. No convergence of lines will be seen, and, as we have our apparatus ready, we may carry this experiment further, to prove that it is not lines or objects at a great distance from the lens or eye that causes convergence, but the angle at which an object is viewed.

As we have settled the parallel vertical lines, now let us draw two or more horizontal lines, after which place the camera exactly parallel with the drawing-board, but at one side of the table. You will find no convergence of the horizontal lines—even, in fact, you may move the camera right across the table, and so long as you keep it parallel with the drawing-board no convergence will take place. However, as I said before, any departure from the right angle will cause more or less convergence, for on looking in a natural way at any natural object with vertical lines the eye of necessity forms a right angle with such object; but on looking at a high tower from its base an oblique view only is obtained, which is neither natural or comfortable, however pleasing such views may appear with reference to horizontal lines looked at obliquely.

In carrying out the above experiments it is unnecessary to say that non-distorting lenses only must be used.—I am, yours, &c.,

Barnard Castle, March 26, 1878. J. T. Bainbidrge.

EXCHANGE COLUMN.

I will exchange a Dallmeyer's 15 × 12 rapid rectilinear for a No. 4 or 5 D group lens by the same maker.—Address, G. Hadley, 33, Newland, Lincoln.

I will exchange mahogany repeating-back camera and lens, also walnut half-plate camera, for whole-plate bellows camera.—Address, W. Fisher, 2, Nashville-place, Hanwell, W.

Wanted to exchange, a 12 × 10 Kinnear, with swing-back, focussing-screw, and four carriers, quite new, for a wide-angle rectilinear, or a pair of wide-angle rectilinear stereo. lenses, or sciopticon.—Address, J. Schofield, Heaton Mersey, near Manchester.

Edwards's graphogenic apparatus with dark slide, for plates $6\frac{1}{2} \times 4\frac{3}{4}$, and iron-bound deal box, for packing chemicals when travelling, offered for Dallmeyer's 1B long or Ross's No. 2 *carte* lens, or Cusson's photo-lectern.—Address, A. Davidson, Station-road, Carluke, N.B.

ANSWERS TO CORRESPONDENTS.

Photographs Registered—

P. Piquepe, Acton.—*Two Portraits of Leo XIII.*

H. Murdoch, Ayr.—*Two Views of "The Twa Brigs o' Ayr."*

John Carr, Montrose.—*Portrait of the Late G. Paul Chalmers.*

John Moffat, Edinburgh.—*Two Portraits of Rev. Alex. M'Kenzie.*

R. Banks, Manchester.—*A Photograph entitled "The Accessory Picture."*

J. R. Prophet, Dundee.—*Two Portraits of Mr. J. Kennedy, Scottish Vocalist.*

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

Juvenis.—Let the mounting-board be slightly damped, and there will be no fear of perfect adhesion.

T. G. A.—1. Any enlarging camera will answer your purpose.—2. Coat the wooden trays with a mixture of wax and paraffine.

Varnish (Belfast).—The alcohol has been rather too weak, but we find that when the negative is heated to a sufficient degree it gives a glossy film.

T. F. Paxton.—We, too, have had the same experience. Gummed paper will not adhere to glass for any length of time. Sooner or later it becomes detached.

H. H.—More depends upon the negative and the paper than upon the formula for the toning bath. However, you may try the effect of increasing the proportion of tungstate.

J. Cockburn.—We regret that we can obtain no information whatever respecting any process in which the sub-nitrate of mercury has been proposed as a substitute for nitrate of silver.

W. T. B. (Bradford).—We are unable at present to give the formula; but we understand that as soon as the best conditions for working it have been ascertained photographers are to be made aware of it.

H. M. C.—You are bound to serve, according to the terms of your indenture, until you are twenty-one years of age. Such, at anyrate, is our opinion; but you should consult some friend in the legal profession.

Geo. W. Brogden.—The enclosure in your letter is an additional instance of a fact of which we have long been aware, namely, that excellent prints may be obtained upon durable sensitised paper over a year after the time of its having been sensitised.

H. Edwards.—Four feet by two and a-half feet will prove suitable dimensions for the window in your laboratory. It would have been better if circumstances had permitted its being made larger, but, from the plan sent, this does not appear to be possible.

R. D. B.—The tone is good enough, but there is a great lack of vigour in the print. The cause of this it is impossible we could tell unless made acquainted with the circumstances under which the paper was prepared. Does the negative possess the requisite degree of intensity?

Auld Reekie.—Having looked over the volume for 1872 (the year indicated by you) we have failed to discover any allusion to the matter of which you speak. Will you obtain further and more definite particulars, and write again? The subject is one possessing much interest.

D. H. W.—You have been quite correctly informed. There *is* a secret in connection with the method of working the process; and, when the whole of the circumstances are taken into consideration, it is scarcely to be wondered at that the firm are somewhat reluctant to divulge more than they can help.

George Ross.—The extreme acidity of the sensitising bath may account for the difficulty experienced in toning. Try a neutral bath of the strength of forty grains. Fume the paper with ammonia through the agency of the pads in the printing-frame; wash after printing in three changes of water, and then transfer to the toning bath. By adopting this course you will have no cause of complaint as to bad toning of your prints, presuming that you make use of the same toning bath hitherto employed.

A. M. A.—While the placing of a ground plate of glass behind stereoscopic transparencies is the most ready method of mounting them, it is not the best. A much better system to adopt is to apply a coating of fine matt varnish to the picture.

Obliged Reader.—There is a great difference between decomposing by means of heat the chlorate of potash and nitrate of ammonia. In the former case pure oxygen is liberated; in the latter the gaseous emanation is not oxygen, as you imagine, but nitrous oxide, which is, in fact, the "laughing gas" of the popular chemical lecturers in Mechanics' Institutes and at "Polytechnic" gatherings.

Georgius.—We think that under the existing arrangement you cannot make any claim upon your employer for travelling expenses. It was somewhat unwise in you to sign such an agreement; but, having done so, nothing remains but to submit to the terms therein imposed. It does not appear to us that you have so much cause for complaint as, in your estimation, appears to exist. There is scarcely any business extant in which one can have everything he would desire. Consult some clear-headed friend who is better acquainted with the circumstances than we possibly can be, notwithstanding your intelligent letter.

J. Ekralc.—Seeing that the lens at one time produced pictures possessing great brilliancy, its present fogging propensities are clearly traceable to some defect in the mounting. It is very possible, for example, that the black varnish by which the cells or other portions of the mount have been protected has, owing to being rubbed, ceased to have a thoroughly dead, matt surface; and, as a surface covered with a shining black varnish reflects much light, that may be sufficient to account for the fogging. To discover this proceed as follows:—Mount the camera on its stand, directing the lens to a portion of the landscape above which are very bright clouds. Now cover the camera and your head with a large focussing-cloth, and, having removed the ground focussing-screen, examine the lens under these conditions. The result of the examination will probably prove our surmise to be correct.

Medicus.—In stating that an eighth of an inch foreign microscopic power was not better than an English quarter-inch we did not refer to its magnifying power, but to its capability of affording a knowledge of structural detail. What we meant in this statement by a "foreign" power was the achromatic triplets—all the lenses of which are alike—supplied with cheap microscopes. Perhaps it might be more accurate if we distinguished them as "Bavarian powers." Observe that we are very far indeed from speaking disrespectfully of such objectives, for many of them are excellent glasses and define well, having good penetrative qualities; but, from the very nature of their construction, they cannot be employed in resolving difficult test objects. If a quarter-inch object glass of this kind show the markings in *P. Formosum* we should unhesitatingly characterise it as an excellent glass of its kind, although a good English two-thirds will show these markings with great facility.

South London Photographic Society.—The next meeting of this Society will take place on Thursday next, April 4th, at the Rooms of the Society of Arts, Adelphi, when a paper will be read by Mr. E. W. Foxlee, entitled *Hints on the Gelatino-Bromide Process.*

Photographic Society of Great Britain.—This Society will meet on Tuesday next, April 2nd, at 5a, Pall Mall East, when the discussion on Dr. Monckhoven's paper, read at the last meeting, will be resumed; and Mr. England will read a paper entitled *Dry Plate Photography: a Few Remarks on the Various Processes from Practical Experience; with Copies from Negatives Taken by the Different Methods.*

Trade Catalogues.—It is a healthy sign of vitality when new editions of trade catalogues are being issued. We have this week to acknowledge the receipt of two such works—one from Mr. Morley, of Islington (one of our best-known dealers in new and second-hand appliances for photography), and the other from Messrs. George Mason and Co., of Glasgow. It is exceedingly difficult to mention any optical or mechanical piece of photographic apparatus which is not represented in the goodly array of second-hand goods described in Mr. Morley's catalogue. But in addition to the various and numerous second-hand articles are many others quite new, some of the cameras being, apparently, specialities manufactured by Mr. Morley. The catalogue of Messrs. Mason and Co. is merely a "Supplemental Trade Price List" of the photographic apparatus, chemicals, and materials manufactured or supplied by this firm; but this supplement forms a goodly work of 108 pages. It contains numerous illustrations, and a brief account of the nature and composition of most of the chemicals used in photography. It also embraces numerous hints in connection with photographic practice, including the posing and lighting of the sitter.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 935. Vol. XXV.—APRIL 5, 1878.

THE PRIZE DRY PROCESS.

At the meeting of the Photographic Society of Great Britain, held on Tuesday evening last, the conditions under which Mr. Joseph Paget offered his prize of £50 for the best dry-plate process were stated. They were drawn up by a small committee, who embodied in them Mr. Paget's ideas respecting the requirements of a good dry process. These conditions we shall publish *in extenso* on another occasion—probably next week; but in the meantime we shall give a digest of them.

Each process entered in competition must be described with so much fulness and in such detail as to enable any ordinary photographer to secure results which shall equal those obtained by wet collodion, whilst it must yield plates that will keep good for four months previous to exposure and three months after exposure. Both exposed and unexposed plates (three $8\frac{1}{2} \times 6\frac{1}{2}$ of the latter) must be lodged with the committee before a certain day in March, 1879, accompanied by the detailed description already alluded to; and provision is made for respecting the privacy of all communications save that having reference to the process to which the jurors shall award the prize, which is to be done without their being aware of the identity of the fortunate competitor. It is scarcely necessary to add that the prize process is to be published for the benefit of the world, there being no restriction as to its being practised by all.

It will be seen that the property of sensitiveness is not imported into the conditions mentioned, *certainty* (irrespective of duration of exposure) being what is chiefly sought to be realised. In one of the conditions, however, there is a proviso to the effect that if two or more of the competing processes shall equally satisfy the requirements as to quality and keeping properties that which is found to be most rapid shall have the preference.

That the process to which shall be awarded the prize will be a slow one—slow, we mean, as regards the great sensitiveness that has now been reached with dry plates—may, we think, be accepted as a foregone conclusion. One reason for thinking so is that in all the dry processes known to yield plates that will keep after exposure albumen is found to be an ingredient in the preparation, and no process associated with that substance is recognised as possessing great rapidity. This, we think, is a matter that falls within the experience of every worker with the collodio-albumen process, no matter in what guise or under what name that process is presented. Gelatine, when used not as a preservative for collodionised plates but as a substitute for the collodion itself, affords the means of making a bromised emulsion by which an exalted degree of sensitiveness may be obtained; but while the excellent quality of the negatives secured by this process are well known, together with the admirable keeping properties of the plates *previous* to exposure, we are not aware of anything having been placed on record by which we may predicate with certainty the enduring properties of the latent image impressed upon such plates. It may be that they will keep for as long a period after exposure as those prepared by albumen, but we are not aware of the data for forming such a belief having been published.

What, we wonder, would be the consequence if the process which was proved most completely to fulfil the conditions attached to the prize turned out to be some old and well-recognised one of days long gone by—say the Taupenôt, Ryley, Fothergill, England, Gordon, or other methods of preparing plates with or without albumen? There being no stipulation that the competing process must be a new one, and there being much evidence to prove that even when adhering strictly to the letter of description of a process the experience or skill of one worker will enable him to obtain by such a process results vastly superior to those secured by a competitor less fortunate in these respects, it is not impossible the award may, after all, turn out to have been given for experience and dexterity in the manipulation of a process long pre-existing. This will, doubtless, have received attention from the committee (Messrs. T. S. Davis, W. England, and W. Bedford) appointed by the Society to aid Mr. Paget in placing the conditions of the award on a satisfactory basis.

Had time permitted Mr. England was to have read a paper on dry processes at the meeting on Tuesday evening; but, owing to the length of the discussion on the fading of carbon prints, the paper was postponed till the next meeting, which is to take place on the 14th May. We are quite uncertain in what way Mr. England will treat his subject; but, on the possibly mistaken assumption that he will confine himself in the main to giving a detailed account of the process by which he produced those admirable landscapes for which he was awarded a medal at the last Photographic Exhibition, we shall in our next number give the first of a brief series of articles on certain dry processes of the present and past time, those of a previous period being confined to processes that have stood the test of time, and which, in many important respects, are worthy of the highest consideration from the most advanced workers of the present day. Quality of negative, keeping properties before and after exposure, and rapidity have already been secured, although not all by means of one process. The efforts of the experimentalist should be directed towards combining in one process all these desirable features.

APPARATUS FOR THE PRECIPITATION OF EMULSIONS.

The description of Professor Stebbing's apparatus for the precipitation of collodion emulsions, given in our last Almanac and also, more recently, in a letter from our Paris correspondent, raises a question as to the benefit derivable from the general adoption of that or similar contrivances for the purpose. Independently of any special form of apparatus, however, the subject presents itself in two distinct phases. We may consider it in an economical light—that is, as a means of economically recovering the waste material—and also as a mechanical aid to the physical perfection of the product with a minimum amount of trouble.

The first is a matter which more closely affects manufacturers, or those who prepare the emulsion upon a commercial scale, for we think there can be no two opinions as to its practical economy to the amateur or to those who only manipulate small quantities occasionally. In comparison with the saving of silver residues, we must bear in mind the lower cost of the materials it is sought to save, and also the greater difficulty of the operations involved, when we think it will be agreed that on a small scale the trouble will more than counterbalance the advantage. Even in working upon commercial qualities it is questionable whether the trouble involved in the fractional distillation of the semi-volatile liquid resulting from the precipitation of the emulsion does not more than compensate for the economy of material secured, and it may be doubted whether the product so obtained in the hands of comparatively inexperienced persons would be of such a character as regards uniformity as to conduce to perfection in the properties of the emulsion in which it is subsequently employed.

We have convinced ourselves by experiment on a small scale that a large proportion of the volatile solvents may be recovered by fractional distillation in a state of purity quite sufficient for all emulsion purposes, but it is at the expense of such an amount of trouble and care as we do not suppose any manufacturer of emulsions could afford to devote to the operation, to say nothing of the hazardous nature of the operation unless special apparatus be erected for the purpose; while the material recovered is so cheap, and the supply from ordinary sources so plentiful, that it is doubtful whether its actual money value would compensate for the mere expenditure of time. We are, of course, assuming the use of methylated solvents; if it were necessary to employ the pure products possibly the increased expense might render their recovery on a large scale remunerative.

On the ground of utility as a labour-saver, however, we are inclined to believe that the adoption of a simple form of apparatus might be beneficial both to the manufacturer and to the amateur, its special character being of course dependent upon the quantity of material to be operated upon, as well as upon other conditions. The ingenious but complicated apparatus of Professor Stebbing, it is scarcely necessary to say, is more suited to the requirements of the wholesale manufacturer than to the amateur, in whose hands it would partake very much of the character of the proverbial "white elephant."

Since the popularisation of the method of precipitating emulsions in place of the original plan of washing, much has been written regarding the conditions necessary to complete success; but it is doubtful whether any of the rules laid down will prove equally effective under all circumstances. Very much, of course, depends upon the nature of the pyroxyline used in the formation of the emulsion, and if the highest degree of success is to be obtained with certainty a special sort is necessary. Still with inferior samples—that is, samples which do not possess to the fullest extent the necessary power of withstanding the effects of precipitation, though otherwise well adapted to emulsion purposes—it is possible by the exercise of care to produce a satisfactory result; while, on the other hand, the most perfect sample of cotton does not free us from the responsibility of the exercise of ordinary precautions.

The operation of precipitating an emulsion when performed upon a small scale—say one or two ounces—presents no special difficulty if the pyroxyline be of a character in any way adapted to the purpose; but in proportion as the quantity is increased so do we find the difficulties make their appearance, and this is equally true whether the emulsion be poured into the organifier, or *vice versâ*. Let us watch closely the operation as it proceeds. We commence by pouring a few drops of emulsion into pure water or an organifier, stirring the while. Presuming the emulsion to be of fair quality it is at once precipitated in fine clots perfectly distinct and with no tendency to coalesce; as we proceed, however, a point is reached at which the proportion of ether and alcohol present is sufficiently large to exercise a partial solvent effect upon the precipitate, which, if the stirring be discontinued, is found to mass together in a pasty lump. So long as no further change in the conditions occurs this solid mass is easily broken up by stirring, and if more water be gradually added it at last loses its coherence and settles to the bottom in small, distinct fragments, and may be easily collected.

If, however, while the precipitate is in the sticky condition the diluted solvents are poured off and replaced by fresh water (which is done with the greatest ease at this stage without any loss of the solid matter), the whole mass solidifies into a tough, leathery condition, and becomes almost impermeable to water and most difficult of management. A somewhat similar result occurs when the mode of precipitation is reversed, and it may be generally traced to the use of too small a quantity of water in proportion to the bulk of emulsion. It is usually recommended to employ three or four times the quantity of water as compared with emulsion; but no reliance can be placed upon such a rule, as we have found some emulsions precipitate satisfactorily with less than their own bulk of water, while others refuse to do so however large a proportion may be used.

It is in overcoming this uncertainty that the employment of hot water recommends itself, as, owing to the volatile character of the solvents, they are in great part driven off in vapour the instant the emulsion comes in contact with the heat. In addition to this, by the sudden volatilisation of the ether the emulsion is precipitated in a spongy, porous state particularly favourable to the subsequent removal of soluble matter. But, as we have before pointed out, the use of hot water has the disadvantage of seriously affecting the working qualities of the emulsion; hence we cannot recommend its adoption except when it is found by experiment to produce no ill effect.

But to return to the subject of apparatus. We require some means by which the emulsion may be brought rapidly and effectively into contact with the water or organifier, so as to instantly deprive it of its ether and alcohol, and, in operating upon considerable quantities, to prevent the subsequent massing together of the precipitate as the emulsion continues to be added. We have attained the first end by the adoption of a simple contrivance on the principle of the chemist's washing bottle. A wide-mouthed bottle of suitable capacity is accurately fitted with a good soft cork, through which are bored two holes to take a couple of glass tubes. One of the latter is drawn to a capillary point and bent in the form of a syphon, the open end of which must pass through the cork and reach to the bottom of the bottle; the second tube is bent at right angles, and merely passes through the cork to form a mouthpiece by which air may be forced into the bottle. The joints must be made as airtight as possible by means of wax or otherwise.

To use this arrangement the emulsion previously filtered is poured into the bottle, and the cork carrying the two tubes inserted as tightly as possible. If, now, air be forced in through the mouthpiece the emulsion will be ejected in an extremely fine stream from the capillary opening of the syphon; and if it be directed into a vessel of water, or of some organifying solution, it is precipitated in the state of fine shreds or strings, which, if kept well stirred for a short time, show little tendency to conglomerate. The operation of precipitating a given quantity of emulsion by this plan is necessarily slower than if it be merely poured from a bottle or through a funnel, but it is much more complete. A quantity of ten ounces may be precipitated in three or four minutes, using the lungs as the source of pressure, the exertion being no greater than in using the blowpipe. As a further refinement a continuous blast from a foot blower might be employed.

With a difficult sample of pyroxyline we have found no necessity for any further appliance when working with eight ounces of emulsion, but with larger quantities it is desirable to arrange for the gradual removal of the spent solvents as they accumulate. This we effect as follows:—A tall jar (a pint jam pot answers well) has its bottom removed, and a piece of muslin or canvas stretched securely over it so as to form a sort of sieve. This is suspended or fixed in a second jar or vessel in such a manner that the canvas diaphragm is at least an inch from the bottom of the outer vessel, which must be shorter than the first-named, in order to allow the excess of water to flow over its edges and escape before the internal vessel becomes full.

If this arrangement be placed in the sink or in a large basin, and a stream of water from the tap turned into the central compartment, it is evident that it will pass through the canvas diaphragm and fill both the compartments to a certain height; but as soon as it reaches the upper edge of the outer jar it begins to escape into the sink and can rise no higher in the "sieve." It is also plain that if the emulsion be poured into the inner compartment simultaneously with the stream of water the ether and alcohol will escape with the surplus water, while the diaphragm effectually retains the solid portions of the emulsion, which are rapidly and certainly precipitated without the slightest loss.

This arrangement may seem complicated upon paper, but is not so in fact. The whole affair, including syphon bottle, was "rigged up" and got into working order in less than half-an-hour (with the exception of knocking out the bottom of the jam pot, which had been previously done for another purpose) at the cost of a few pence, and is as effective as if it had cost two or three times as many shillings. It may be used with hot or cold water and upon any quantity of material; for as the precipitate accumulates it may be removed into clean water without any fear of its becoming massed together, owing to the entire absence of ether or alcohol. Lastly: either portion of the apparatus may be employed separately when such a course seems desirable—in fact, the one last described will, in many cases, do away with the necessity for the wash-bottle.

AMMONIA.

Holding a position of corresponding importance in dry-plate development to that of acetic acid (to which we recently devoted an article) in wet-plate work, a companion article may suitably be presented upon this substance. Whether it is in the form of solution of caustic ammonia or the solid sesquicarbonate is of equal relevancy. It has, in conjunction with pyrogallic acid and bromide of potassium, been the means of revolutionising the practice of dry-plate work, and it is essential that the photographer engaged in experimenting with its aid should be able to obtain it of uniform strength and purity, and be further able to test it in some simple manner; for both liquid and solid are liable to considerable fluctuations in strength.

At the present day its main sources are the ammoniacal liquor produced in the manufacture of gas—a source which is so polluted that it is next to impossible to obtain pure products from it. Formerly the ammonia found in commerce could be obtained sufficiently pure, the manufacture for a long period having been conducted on the same principle and originally produced from the soot collected from the burning of one form of animal excreta—camel's dung—in Egypt near the temple of Jupiter Ammon (whence we get its name). It was afterwards obtained from putrid urine, and also by the destructive distillation of animal substances. At the present time we may be said to depend entirely upon three sources for our supply—the gas liquor already pointed out, the boracic acid layers of Tuscany, and such animal matter as bones, hartshorn, &c.

The ammonia from gas liquor, which forms the largest portion of our supply, is, perhaps, the most impure, being contaminated with many of what are termed the compound ammonias, together with other matters of an empyreumatic nature.

The dry distillation of animal matter yields a product more easily purified, its main impurities being empyreumatic.

The finest and purest kind of ammonia is, however, that obtained as a by-product in the manufacture of borax. When soda is added to the boracic acid, ammonia in a state of great purity is evolved, and is made use of for the production of ammonia solution and ammonia carbonate, which are met with in commerce under the name of "volcanic ammonia." This is the purest obtainable in the usual way, and is what we would always recommend our readers to employ for all delicate work.

Solution of ammonia is most commonly met with in an almost saturated form of specific gravity ·88, a fluid drachm containing 15 88 grains of pure ammonia. It is liable to become contaminated with carbonate, lime, metals, sulphates, chlorides, and sulphides, its freedom from which would be shown by the absence of precipitate or turbidity upon the addition of solution of lime, oxalate or hydrosulphuret of ammonia, or ammonio-sulphate of copper, and, when treated by excess of nitric acid, by the absence of turbidity upon addition of nitrate of silver or chloride of barium. The solution should further be free from colour, which, in conjunction with a peculiar smell, indicates the presence of empyreumatic oil.

A well-known quality of the solution is its power of dissolving many salts and oxides insoluble in water—notably silver oxide and bromide.

The carbonate of ammonia, so called, is, in its parent form, perhaps more correctly called the "sesquicarbonate," there being other carbonates containing less and more acid. It is obtained by sublimation in cakes about two inches or more thick, which, when quite fresh, have a clear, translucent appearance, rather fibrous than crystalline in texture. Exposed to the air the pieces decompose rapidly, ammonia being evolved and the acid carbonate left behind. This decomposition is shown by the change in appearance of the carbonate; it becomes quite opaque, a few minutes' exposure to air being sufficient to produce a visible alteration. Even when kept in well-stoppered bottles it will gradually alter, and, in consequence, it is always necessary when making a solution to remove all the opaque crust, and use only the clear, transparent inner portions of the lumps.

The composition of the sesquicarbonate is open to considerable doubt, authorities differing very considerably from one another; the opinion of Rose, that it varies according to its mode of preparation, seems most likely. It is stated that repeated sublimation diminishes the proportion of the sesquicarbonate in the condensed product. However, by the authority referred to by us recently in our article on standard solutions, &c., it is required that fifty-nine grains dissolved in an ounce of distilled water should be exactly neutralised by the 1000-grain measure of the oxalic acid solution; 1·5 grain of it is also dissolved by seventeen grains of citric acid.

It is soluble in water at 13° C., in the proportion of twenty-five parts to one hundred; at 17° thirty parts; at 32° thirty-seven parts; at 41° forty parts; and at 49° fifty parts. At a higher temperature than the latter the salt is decomposed, carbonic acid being evolved, and a solution of the normal carbonate being left behind. Hence it is obvious that the solution kept for developing should not be made by boiling water. This solution when exposed to air gradually decomposes, the acid carbonate being produced; it should be kept in tightly-stoppered bottles, a little wax or paraffine melted over the stopper being a good safeguard for either the cakes or the solution if they are to be kept any length of time. We repeat it is most desirable to use only the clear, unchangable pieces for solution, and if possible always to obtain the "volcanic ammonia."

The ammonia more commonly sold is liable to an impurity which is especially obnoxious to photographers—nothing less than hyposulphite of ammonia. When the sesquicarbonate is prepared from either a sulphate or a chloride containing a sulphate this impurity is most likely to be met with, and it is not always entirely got rid of by resublimation. It may be detected by the addition of nitrate of silver to a solution of the carbonate neutralised by acetic acid, the well-known white precipitate turning to black even in the dark easily showing the presence of the sulphuric acid. Such samples should be rejected entirely.

RECENT PATENTS.

No. VI.—TINTED CHROMOTYPES.

When speaking of the pictures that were displayed at the last exhibition of the Photographic Society of Great Britain, we drew particular attention to a number of exhibits by Sir Thomas Parkyns, which, from the colour of the picture, suggested various effects, such as moonlight, summer, winter, and soforth. We hazarded a guess as to the method by which they might have been produced, and promised to give further details as soon as the specification of the patent was published. This promise we now redeem. The provisional specification is brief, and is as follows:—

This invention relates to improvements in the process of printing chromotype and autotype photographic pictures so as to tint or colour the same. For this purpose, according to my invention, I employ two methods of producing coloured effects in chromotype or autotype prints.

First. In place of applying plain collodion on the waxed glass previous to applying the pigmented tissue (supplied by the Autotype Company), I use collodion, coloured according to taste or fancy or the requirements of the particular case or subject.

Second. I proceed with the process of printing according to the usual practice in chromotype, but before transferring the gelatine pigment from the glass to the transfer paper, which constitutes the finished print, I flow the gelatine alum-fixed picture with coloured collodion, by which a coloured print is imparted to the picture.

The tints produced and imparted to photographic prints in the process of printing, as previously described in accordance with my invention, may be greatly varied, depending upon the character and proportions of the permanent colours or pigments and chemicals used, and in the manipulation thereof.

More complete details are given in the following completed specification:—

My invention is an addition or improvement to the autotype and chromotype processes. It consists in the fact of my being enabled to colour prints so as to produce a pleasing relief as to tint from the ordinary monotone, or white and black, or one shade of colour. I therefore designate it "bichrome."

I adopt the autotype system exactly, with modifications or additions, and for this purpose I use a coloured medium. These mediums are various, but some of them are difficult to manipulate, and none of them so good, practically, as collodion, seeing that they must be applied with water, which requires a considerable time to dry, and is more difficult to manage, whereas collodion flows regularly on the plate and dries immediately. I treat, therefore, of collodion only, reserving the right as to other mediums which might be applied to the principle of my invention.

I prefer to use no fugitive dyes or any colours which are likely to fade or change; nevertheless, it is at the option of anyone working under this patent to use any means or colours, or kinds of colours, he may choose, but he cannot in such case guarantee his productions to be permanent unless his dyes or pigments be so accredited by the profession.

I use no colours except dry pigments. These are principally earths or pigments known from long experience to be absolutely permanent, such as the madders; but I can use any colours. These colours I mix in various proportions and thoroughly grind and levigate them in a mortar, adding more or less of the various colours until the desired shade or tint is obtained.

When the proposed colour is arrived at, or supposed to be, I add a very small quantity to a very small quantity of collodion (as described hereafter), and having allowed it to thoroughly dry on white paper, it (after having been well shaken) gives the permanent colour of the medium. The pigments not being all of the same weight I use a small measure, about as large as a small thimble, to which a handle has been attached, and of a size suitable for the necks of my pigment bottles. With this I take so many parts of one colour, and so many parts of others, carefully registering the various proportions, so that there may be no uncertainty afterwards. I find that about half a measure is sufficient to colour one ounce of plain collodion, because the tint should generally be arrived at by the mixing of the pigments to the proper shade, and not by adding pigment to the collodion. If too much pigment be added the result will be that in the final operation the transfer paper will not have the power to "pick up" the first collodion, the result being unsatisfactory. Neither must the collodion be of a horny nature, or made with too much pyroxyline.

For the collodion (normal) I take about one hundred grains of a medium pyroxyline (which must not be powdery, nor too tough), and having put it into a bottle I add ten ounces of the strongest ether (methylated will do). I then add five ounces of the strongest methylated alcohol. This nearly dissolves the pyroxyline. I then either add a portion of another five ounces of alcohol to the pigment in the mortar, and grind it again for a minute or so, and pour it into the collodion (washing out the mortar with the remainder of the alcohol); or I put the whole of the alcohol into the collodion and add the pigment in powder. In either case the whole must be thoroughly well shaken, when it may be immediately used.

The above is the formula, which may be increased or diminished to any extent.

The measure for the pigments which I use is about five-eighths of an inch deep and half-an-inch in diameter, three or four of which I find about sufficient for six ounces of the collodion.

I now proceed to describe the way in which I utilise my invention:—So far as the autotype procedure goes I follow it up to the point when the tissue-developed picture has been fixed with the alum water, washed, and allowed to dry. This may be gradually hastened. The preliminary wax had better not be rubbed off too much so long as it is smooth. The alum-fixed picture having been washed and dried, is flowed with the coloured collodion, as above described, and having been allowed fairly to set (which takes a very short time), the plate is plunged into cold water, where I leave it for a few minutes. Meantime the transfer paper (white) is prepared, and when ready the treatment proceeds as usual. It is preferable to allow the picture to dry spontaneously in a warm room, and it should be put under a moderately heavy pressure, as usual, previous to drying. The proceedings are, in fact, precisely similar to the autotype double transfer processes, with the exception of the flowing the alum-fixed picture with the coloured medium previous to transfer.

I proceed to add some ideas which have arisen in the course of my experiments:—As above stated there are other mediums which may be used in the processes, but they are aqueous, and as such I do not recommend them; for instance, albumen, gum, gelatine, &c. They take long to dry, and the after-washing removes part of the colour, the consequence being that they dry very unevenly. They do not properly hold pigments in the same manner that the cotton in collodion does, and I therefore prefer the latter for the purpose required.

I have found that dyes cannot be depended upon, as they change colour in the process of washing to a great extent. According to my process the dry colour thoroughly amalgamated with the film of the pyroxyline is held by it, so that it can be put into water, and kept there for any reasonable time, without any change of tint. If, therefore, ordinary care be taken in the original preparation there ought to be no variation in the final results. I do not doubt but that those using the patent may find it capable of considerable modifications as regards the variations of colours in the same picture by means of masks, &c.; but as I do not believe that this can be done to advantage I refrain from recommending it.

In the mixing of some colours I use large quantities of white (principally zinc), thereby producing a body colour, and enabling me to produce any tint required. Some colours I use pure—green oxide of chromium, umber, siennas, and others; but all may be mixed with white, except when used with the first, or, rather, only collodion. Black I do not use to any great extent, and principally for moonlight or mourning colours. It may, however, be used for other shades of other colours.

The numerous shades of tissue paper, purples, red, brown, black, &c., to be procured in the market enable, or may enable, the artist to combine almost any two colours, the one representing the image of the picture and the other the background, either in harmony or contrast. There is an unlimited field for a display of taste. I generally filter my plain collodion through a proper filter, and then add the pigment. After standing I stir up the deposit of pigment, should there be any, with a glass rod and thoroughly shake before use. I find no loss in proceeding thus. If the collodion is too thick I add ether and alcohol; if too thin, more pyroxyline; if the colour is too pale, more pigment.

I sometimes, though rarely, pour coloured collodion on the waxed surface of the plate instead of plain collodion, but I find this a very delicate operation. The plain collodion must be only slightly tinted with a few drops of the coloured collodion above described, otherwise there will be a veil over the image, and those colours known as transparent are only used, and in small quantities, but great care and judgment are required. No body colour—that is, colour mixed with white—can be used. Prints thus treated should be permanent, which is not the case with dyes, neither will the pigment be washed out in the course of manipulation, so that the tint remains as intended. I find all aqueous solutions used as mediums uncertain, and the colour added to them is more or less washed out in the various operations. I believe that the fibrous pyroxyline with collodion, if allowed to dry sufficiently, holds the dry pigments, the same having been thoroughly incorporated with it, and that to a great extent the coloured film so formed is uninjured by water. This, so far as my experience goes, is not the case as regards fluid dyes, or any mode of colouring soluble in water. After the print has been allowed to dry, and has been stripped from the glass, it may be at once plunged into cold water and left there for a few minutes. It can then be nearly dried between blotting-paper, and while still damp at once be mounted. The wetting of the print reduces the high gloss and produces a semi-matt surface.

Having now particularly described and ascertained the nature and objects of my invention, and in what manner the same is to be performed or carried out in practice, I hereby declare that I claim the said invention of "Improvements in Chromotype and Autotype Photographic Printing, and Colouring or Tinting the same," substantially as hereinbefore set forth and described, consisting in the manner of mixing pigments thoroughly levigated with a collodion, such collodion, so coloured, according to taste or requirement, to be applied as an addition or improvement to the autotype or chromotype process, according to the double transfer system, the coloured collodion being poured on the developed, alum-fixed, washed, and dried plate previous to transfer, my principle being that the collodion cotton film impregnated with dry pigment and properly set will retain the desired colour notwithstanding the requisite washings, whereas aqueous solutions of any kind will not do so, as far as my experience extends.

From the foregoing specification of Sir Thomas Parkyns' patent it will be seen that we shall be justified if we indulge in a little gratification at our having made so lucky a surmise as to its nature when, in an article on *Effects in Photographs*, at page 518 of our last volume, we gave it as our opinion that, "by imparting a tint to the collodion forming the substratum upon which the carbon print is transferred and developed, it will be evident that this tint will affect the appearance of the print after it has been attached to its final support, and the collodion film which was formerly the substratum has assumed the position of the superstratum or external covering of the image." Having already, in the article from which we have just quoted, given our ideas respecting the various effects that may be obtained by adopting such a method as that here described with so much detail by Sir Thomas Parkyns, we may now leave the matter in the hands of our readers.

There is one point upon which Mr. Charles Bennett lays particular stress in his article in our last number which, in its bearing upon the sensitiveness of dry plates, deserves considerably more attention than it receives at the hands of the majority of photographers; we allude to the employment of a thoroughly non-actinic light in the preparation and development of the plates. It is now some years since it was first demonstrated that in this respect dry bromide films are more *exigeant* than even wet plates; and, as at the time when notice was first called to the fact dry plates were not found, in practice, to be more generally sensitive than wet ones, the difference was attributed to a greater sensitiveness on the part of silver bromide to particular rays of the spectrum. But, taking into consideration the whole of the facts connected with the behaviour of wet and dry plates respectively, we have always found some difficulty in accepting this theory, and a simple experiment performed during last summer convinced us that the difference is due entirely to other conditions, and that wet plates may be made to exhibit extra sensibility and to require greater care in the selection of the light. It has been pointed out, over and over again, that the greater liability to fog which a dry plate exhibits when prepared and developed in a light which may be sufficiently non-actinic for a wet plate arises from the much longer period during which the former description of plate is exposed to the feeble amount of actinism that may be present. This may be true enough, but there is still more to be said. If, employing the same light, the development of the dry plate be so modified as to be completed as rapidly as the wet plate, the tendency to fog will still be as great, if not greater. Now to bring about such rapid development we must have recourse to one or other of what we may, for argument's sake, term the abnormally strong developers now in vogue with rapid emulsion plates; plainly, the more energetic developer will bring out the fogging effect in a much shorter time than the weaker one, and hence little or no advantage is gained. Anyone accustomed to the deep ruby glass of the dry-plate developing room cannot fail to be struck by the contrast presented by the "dark rooms" of many professional portraitists; but it must be borne in mind that in such rooms rarely is any great departure made from the normal strength of developer. The exposure is made to suit the development, and not the development to suit the exposure. Adopting this train of thought, the experiment to which we have alluded above suggested itself. We had been attempting to develope dry plates in the ordinary light of a wet-plate room with the inevitable result of fog, though wet plates, much more sensitive than our dry ones, developed perfectly clear. We induced our "host" to mix a more energetic iron developer, and, after exposing for a shorter time than usual, his wet plate was, as we fully anticipated, hopelessly fogged. We now covered the window with an additional thickness of deep orange-red tissue-paper, when, upon repeating the experiment, the wet plate under strong development came out perfectly clear. This experiment, we think, distinctly proves not only that the quality of the light exercises a powerful effect upon the *practical* sensitiveness of the plate, but that that effect is not confined to bromide films, as is generally supposed, but applies equally to bromo-iodised wet plates.

A DEMONSTRATION OF THE PREPARATION AND DEVELOPMENT OF "PALMER" FILMS.

[A communication to the Liverpool Amateur Photographic Association.]

The recent publication of a new film process of exceeding simplicity, and one which may be readily accomplished in all its operations by every amateur who pleases to make the attempt, has elicited so much notice in many directions that I have ventured once more to trespass upon your time and patience, in the hope that I may augment the interest of our meeting tonight by enabling you to witness all the details of this process from beginning to end, and also that I may convey additional information to the many who are seeking it on this subject.

My first proceeding is to take a clean glass of quarter-plate size, and, having placed it upon a level surface, I pour upon it three drachms of a thirty-grain solution of gelatine in dilute ox-gall. I distribute the pool from the centre to the edges of the plate, with the help of the tip of the forefinger, which answers better for the purpose than a glass rod, and then remove possible bubbles with the point of a penknife. For this preliminary film, as well as for the emulsion itself, I find that Nelson's opaque is better adapted than the clear photographic gelatine. The latter does not leave the glass so readily, and the opacity of the former effectually prevents blurring, and, at the same time, does not affect materially the printing capacity of the negative.

The remarks on the subject of halation made at the last meeting of the Edinburgh Photographic Society had reference, I imagine, to gelatine negatives on glass, and not to these film pictures. I have never met with the slightest tendency to blurring in my films, and the entire absence of it when opaque gelatine is employed enables me to give up the plan I had first adopted, namely, of backing up each film with a glass coated with coloured gelatine and sugar. In the film negative of the *Interior of Wallasey Church* the large east window is as clear and sharp in all its detail as would be the case with a wet plate. I have exposed dry plates of all kinds upon this subject, and, in spite of a backing of colour, blurring invariably takes place at this point in the picture.

We now sensitise our dried film by pouring upon it a pool of emulsion, and distribute the latter over the surface with the tip of a *clean* finger. To avoid waste of emulsion, this operation is better conducted upon a dish or tray, and any spilt gelatine may be restored to the vessel of emulsion for further use. It is important that the proportion of gelatine per ounce be the same in both the preliminary and the sensitive coating. If this be not the case, the film will curl and give trouble under the developer. Some gelatines which I have been using lately manifest a tendency persistently repellent of the emulsion. When this is the case it is better to add a few drops of ox-gall to the latter. It will now flow better over the surface; but will still require to be humoured a little by tilting the glass towards each side in succession, so that the surplus emulsion may run round the edges of the plate two or three times.

When thoroughly dry, the film is readily stripped from the glass, and may be exposed in the camera. The best method of securing a sufficiently "taut" surface in the dark slide is, in the first instance, to make the sheet slightly longer than the required size. It is then laid face down upon a sheet of blotting-paper; a glass is pressed into close contact with it, the two ends are moistened with the tongue, folded over, and so fastened to the back of the glass support. In changing the film, a knife readily effects the separation, and the glass is ready for a fresh sheet.

Mr. Kirkby has suggested that these films should be prepared upon ferrotype plates of the larger size, so that a perfectly rigid support may be provided for use in the dark slide. I have tried this plan, and find that the plate will take the gelatine as readily as glass. It will be necessary to secure perfect flatness of the plate during the coating, and the film will strip off for development and printing with perfect ease.

Of the requisite exposure I need say little. It will suffice to mention that the films I am about to develope were exposed in bright sun, at 8-30 a.m. yesterday, with Dallmeyer's rapid rectilinear, stop No. 2, for twenty seconds. I place the film in a dish of water for a few moments, pour this off, flow over a ten-grain solution of bromide of potassium and then follow with the ordinary alkaline developer. When detail is fully out, if necessary, I apply an acid silver intensifier, and then fix with hypo., washing copiously before and after each operation. The negative is conveniently kept from slipping into the sink by the assistance of a camel's-hair brush, and the latter useful little accessory helps me to draw the finished film on to a glass plate, and also to sweep out any air-bubbles which may have interposed between the surfaces.

The films must be allowed to dry spontaneously, or inevitable cockling or splitting will be the result. When desiccation is complete, a knife is inserted under one corner, and then swept rapidly beneath the edge of the film. A pause in this operation will sometimes cause a sudden crack across the negative, so also will the temperature of a hot room. It is essential that no attempt be made to remove the negative from the glass upon which it has dried until all tackiness of surface has disappeared. If this be neglected the resulting negative will be useless until it has been wetted and redried, like the specimen I have here.

One word of caution is necessary with regard to density. What would be considered a decidedly weak negative in any other dry process, will be found to possess sufficient printing vigour in the case of a gelatine film. H. J. Palmer, M.A.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

As I have occasionally to produce reversed negatives, I read with some degree of interest the account of Derogy's aplanatic lens described by your French correspondent as being intended for the production of negatives of the kind to which I have alluded. I have been wondering if I should be considered hypercritical in making an observation as to a defect existing in it, and which must mar its excellence for the purpose for which it is intended, which is the production of reversed negatives for the photolithographic and single transfer carbon processes. Photolithography, somehow or other, "smacks" of negatives of engravings, maps, and similar work in which no distortion or want of sharpness is admissible. Judging by the diagram given the lens is symmetrical, and the rectangular prism situated equidistant between the front and back lenses, the tube being, of course, constructed in a rectangular form and the reflecting surface of the prism equidistant from the lenses. In short, mechanical and optical symmetry prevail. Such being the case, where is the diaphragm to be placed? If it be either in front of or behind the prism one of the conditions of freedom from distortion will have been ignored, for as the position of the diaphragm determines the nature and amount of, or freedom from, distortion, that position which is known to secure immunity from this evil cannot here be obtained—always supposing, as I do, that the diagram is correct, which I see no reason for doubting. From this I deduce the fact that with a symmetrical combination like the one in question, and a prism placed in the described position, entire freedom from distortion will not be possible. In order to secure this freedom the back lens must be brought tolerably close up against the posterior face of the prism, and the front lens must be removed a corresponding distance from it in order to admit of the diaphragm being placed as it ought to be—that is, close to the anterior surface of the prism. A copying lens of this kind might with great advantage have one of its lenses of a focus so much longer than its companion as to admit of the diaphragm being placed near to the lens having the shorter focus of the two. Mechanical symmetry would not here be present, but optical symmetry and freedom from distortion would; and these, after all, are the main points to be secured. If instead of a prism a silvered reflector be employed, the matter is one of great simplicity; a diaphragm with an aperture *oval* in its horizontal direction, and placed in the same plane as the silvered reflector, and of course close to it, will yield perfect freedom from distortion coupled with flatness of field and marginal definition *ad libitum*. But "is the game worth the candle?" I think not; for while a mirror may be attached to the front of a lens by means of the mechanical contrivance of a bit of wood and a strip or two of tin, it can only be inserted between the lenses at the cost of an entirely new rectangular tube for the combination. I have given my reasons for my conservatism in this matter, feeling assured that they will be appreciated by every one who has bestowed even a passing thought upon optics as connected with distortion.

In the course of my wanderings I, accompanied by two friends, one day found myself in the editorial office of this Journal, examining, with others, the gelatino-bromide negatives of Mr. Charles Bennett, which are still there, I believe, on exhibition. Of course, the first to be subjected to critical examination was the interior of the room in which the supper table forms a conspicuous object. It was taken on a dry gelatino-bromide plate, by gas and lamp light, with an exposure of one hour, landscape single combination lenses (it is a stereograph) being employed. Here, sure enough, is ample food for thought. Of course the "regulation" thing to do was to hint that possibly daylight may have had something to do in the way of aiding the exposure, or, failing that, the services of oxygen or magnesium may have been secured in connection with the illumination. Both surmises, we were assured, were wrong; the picture was obtained under precisely the circumstances described. If there should happen to be an unusual development of gelatinomania before long Mr. Bennett will have to be held to a large extent responsible. I am aware of several gentlemen having already avowed their determination to "go in" for the gelatine process as described by him. A point worthy of noticing in Mr. Bennett's description of the process is that the longer the time (calculated by days) allowed for the silver-bromide-forming ingredients to digest in the gelatine the greater is the sensitiveness of the resulting emulsion. At first sight one would think that if gelatine were kept in a fluid state for the number of days mentioned by Mr. Bennett it would become decomposed; such, however, is not the fact. Heat, in this case, seems to act as an antiseptic.

(To be continued.)

NOTES FROM AMERICA.

Stability of Pigments in Carbon Tissue.—Reducing Prices.—The Fading of Carbon Prints.

There is much that is commendable in certain observations offered (in *Anthony's Photographic Bulletin*) in the course of a few *Scattered Thoughts*, by Mr. F. M. Spencer. The lowering of prices by professional photographers has been recognised as an unwise step by those who in this country have given the subject their attention. In America there also seems to be a good deal of talk about the inexpediency or folly of reducing prices. Mr. Spencer says:—

It is an expedient that I am convinced will not pay as a rule. It is easier to get down than up, and does not seem to galvanise trade in any ratio commensurate with the sacrifice; for the nearer we get to cost of production the more must be done to realise a living profit, and I do not believe any of us are anxious to work any harder than we have been doing for our money.

No good photographer is overpaid. The nearer we get down to Cheap John prices the closer will the public associate us with a class now too large, who are disgracing a profession they have no fitness to follow. Last spring I advanced prices, and I have had no reason to regret it. I believe my business is better than any of my cheaper competitors; but every man ought to be his own judge as to the standard of prices he can maintain. Expenses are greater in some localities than in others, and in some the people are better able to pay high prices than in others. I do know that in many parts of the country five and six dollars per dozen for cards would amount to prohibition; the people have never paid it, and in these dull times would not, and generally could not, pay it; but for a photographer to throw away the best prices he can get is sheer madness—it does not create a demand, and hurts trade. Once begin reducing and the people will begin to wait for the next reduction, and the next, instead of going in a rush for pictures. Every trade is demoralised in that way—ours already enough so, without committing the most fatal act of all. Let photographers heroically "hold the fort" until other branches of business revive, and we shall see good times once more. There is a rich mine for pictures accumulating—the population of the country is increasing in numbers and growing in size, and a harvest awaits him who preserves his reputation, and is awake for business when the flow of trade sets in.

Mr. Wenderoth has evidently been making a study of the permanence of the various pigments capable of being used in the preparation of carbon tissue, for in the same journal we find him saying:—

Carbon photographs made with the proper materials are *absolutely permanent* in regard to tint, and, under ordinary circumstances, likewise so in regard to materials, but I do not say indestructible; neither are silver prints. In an article of mine published about twelve years ago, on the *Merits of Carbon* versus *Silver*, in regard to the cost of production I said that carbon prints of a reddish-purple tint, resembling photographs, could only be made permanent by the use of one of the most expensive colouring matters, madder lake, and which would raise the cost of production considerably, and that by employing the cheaper kinds of crimson lakes the prints would soon not only lose their purplish tone but depth also. In a rejoinder to this article, I have forgotten by whom, I was called an ignoramus to call crimson lakes unstable. I thought then to argue with one who had so little knowledge of colouring matter as that person would be useless, and therefore passed his assault with silence.

Before I made photography a study I had practised painting for about fifteen years, but being careful in selecting my materials I would never employ a colour without having tried it for a permanency. The mode adopted was to mix some of the colouring matter with silver white, and smear it on a pane of glass in a window facing south, and some on a piece of glass for comparison kept in a room in the shade, and generally a few days of sunshine would be sufficient to prove the worth or worthlessness of any colour so treated. Now any careful painter knows that there is only one kind of this beautiful transparent red colour which is permanent, and which in English is called "madder lake," "crapp lack" in German, and "laqu egaranee de Smyrna" in French.

When I commenced carbon photography I thought it more desirable to imitate the tone of mezzotint engravings, which, in my judgment, is more artistic than the red-brown photograph, and therefore made all my tissue of pure india-ink and the finest ivory or grape blacks. Such carbon prints can never fade, and then there is nothing more permanent than carbon. The red oxides of iron, which are permanent, might be substituted for the madder lakes, but being opaque the tone of the print will be lowered.

In regard to the cracking of the prints: it is a sign of carelessness or faulty manipulation, and if the transfer has been made on a paper thinly gelatinised, and afterwards passed (after the transfer has been effected) through a solution of alum, such a print can only be detached from its support by force, and will not crack. If M. Lambert is unable to work his process during hot weather, it would only show that he is not master of a matter he is pretending to know all about, but it does not prove that carbon cannot be worked successfuly in the hottest weather.

Upon this the editor remarks—

What Mr. Wenderoth states as to the fading of coloured tissues is true. M. Lambert warmly advocates warm-coloured tissues as a great step forward in "Lambertypy," and hence the great wrong practised upon the public, because it is notoriously true that all such carbon tissues fade, as described by Mr. Webster. Therefore if all Lambertypes are made on such tissue they will sooner or later *all fade.*

"W. B. C.," in the same periodical, assumes an air of virtuous indignation against those who speak of the superior stability of carbon over silver prints. But we allow him to speak for himself:—

I have wondered if those photographers knew they were injuring themselves in the eyes of sensible people. How do *they* know carbon prints will not fade? The assertion is only supposition, when, in fact, they *do not know.* I have silver prints that have been made for fifteen years, and to all appearances they are just as good as ever. I have also some ferrotypes I made eighteen years ago that are *just* as good as the day they were made.

We all know that gelatine is affected by the weather, and I have the first enamelled picture (for they are gelatine finish) but checked, and was full of fine cracks in time. True, they look nice when first made, but I think they will *not* wear. Besides, I never knew a patent in my life (that was peddled out as they do the carbon process) that was of any account; and when I see one selling patents I just set him down at once as a travelling humbug.

My worthy competitor here invested in the carbon swindle some months ago, but I have never heard of his making a single picture. I did hear of him, however, rushing frantically round town, the next day after he returned, showing his deed for the *exclusive right* to make carbon pictures, and how he had the world (this part of it) by the tail. But of late I never hear him say carbon. I think it is about the same as the celebrated *souvenir*, and will play out about the same. I think it is only got up by a few to grow rich, if possible, from the photographers of our country.

We have entirely too many travelling about peddling this, that, and the other, and too many photographers are always ready to bite at the bait; and after they have, they applaud it in order that others may also bite, simply because they want to see others equally swindled with themselves, when they should come out and condemn it at once. And our journals are too apt to recommend things for a few dollars that often prove detrimental to the craft.

We do not think that among our readers there are many who share these opinions, which are inserted in our contemporary without any editorial comment; but in case there be a single such one we take this opportunity of showing the fallacy of the reasoning implied in the above, which, if placed in the form of a syllogism, would be as follows:—Gelatine is affected by the weather, and prints which were faced with gelatine have become full of cracks (major premiss); carbon prints are composed of gelatine (minor premiss); *therefore*, carbon prints will become affected by the weather, and become full of cracks. Q.E.D. This logic is undoubtedly sound but for one or two slight fundamental errors. First of all, prints that have been enamelled with gelatine do not crack; and, secondly, a carbon print is not composed of gelatine. This second statement may possibly at first prove surprising to a few; but we must inform them that although a carbon print is made out of a gelatine pellicle, that gelatine is converted into vellum by the action of the light by which the print is formed, the "gelatine" being all washed away by the operation of developing the print, which is now composed of vellum of a varying degree of thickness, having imprisoned in its substance certain pigmented matter, such as carbon. We know that carbon prints will *not fade*, because both vellum and carbon are well known for their durability.

THE REACTIONS OF CHROMIC ACID AND CHROMATES UPON SUBSTANCES OF ORGANIC ORIGIN, CONSIDERED WITH REFERENCE TO THEIR USES IN PHOTOGRAPHY.*

General Properties of Gelatines.

I commence with the most important organic substance of which chromate photography makes use, namely, gelatine. Under this designation are comprised pure glues, without specifying the particular sort. Glues are distinguished as glutin (bone glue from leather, parchment, bones, and isinglass), and chondrin (cartilaginous glue from the side bones and joint cartilages). The properties of the glue vary very much according to whether glutin or chondrin predominates in it. In a pure form neither the one nor the other is a commercial article, but almost without exception all the ordinary commercial and most of the photographic gelatines consist really of glutin. I found very few samples of gelatine rich in chondrin, and these were all photographic. I shall hereafter speak of the composition of the different commercial sorts and of their suitableness for photographic operations.

Though chondrin and glutin generally behave in much the same way, still they can be distinguished by reagents. Alum, sugar of lead, ferric sulphate, chrome alum, and acetic acid precipitate chondrin, but not glutin. Thus one has at hand a means of distinguishing gelatines rich in glutin from those rich in chondrin, by making a ten-per-cent. solution of gelatine in hot water to which a concentrated solution of chrome alum (or a solution of alum) is added. If chondrin be present in considerable quantity the gelatine solution, while still hot, will stiffen in a few seconds, so that one can soon turn the test tube, in which the experiment is made, upside down without being obliged to take care not to spill the contents.

In the following remarks I shall speak especially of gelatine proper, since common sorts of glue are not at all suitable for use in chromate photography. When the contrary is not expressly mentioned the statements apply to gelatines rich in glutin as well as in chrondin.

Gelatine is very hygroscopic, and when dried in air contains, according to my calculations, from fifteen to twenty per cent. of water, which it only gives up completely at a temperature of 120° C. Ordinary sorts, which generally find their way into the market as thick cakes, contain, to follow Heinze's experiments,[1] about nine to sixteen per cent. of water. In cold water they swell out to an elastic transparent mass, which occupies from six to eight times the volume of the dry mass. The quantity of water taken up stands in a certain relation to the goodness of the glue, as Schattenmann[2] first showed. But that this view does not apply to all sorts of glue Weidenbusch[3] showed. He found that the inferior sorts of glue became decomposed after standing twenty-four hours in water of 15° C. With the exception of some bad sorts of lightdruck gelatine, I found that photographic gelatines took up from five to ten times their weight in water of 15° C. Water of from 2° to 5° C. is taken up more slowly by the gelatine, on which account Talbot[4], Sawyer[5], Liesegang[6], Vogel[7], Liébert[8], Voigt[9], and Edwards[10] recommend the cooling down of the chromate bath for pigment pictures with ice, if the too high temperature of the atmosphere would cause the gelatine to swell too much while being sensitised, which produces flaws, and sometimes may have for consequence the solution of the gelatine film in the bath. The chromate bath, therefore, if one wish to guard against disturbances, should not be warmer than from 10° to 18° C.

Gelatine dissolves more or less easily in hot water. The solution is particularly easy when the gelatine has been previously soaked in water. In this last case it will have absorbed so much water that heat is all that is required to dissolve it. Heating in a water bath of 30° to 35° C. will then melt the thoroughly swollen mass. Good gelatine, after its saturation with water of 15° C., does not melt at 25° C., and indeed the kinds of gelatine well adapted to photographic work can be warmed even up to 30° C. without melting. The ordinary sorts of glue and inferior qualities of gelatine melt at about 20° C. Only bad sorts will, under the conditions mentioned, long remain undissolved in the water bath, though some will resist even if the temperature be raised to 60° and 100° C., and such sorts are not at all usable in chromate photography.

These observations are of importance to the photographer, because the sorts of gelatine that become fluid very easily are apt to run off when paper coated with it (as carbon tissue) is being dried at an increased temperature, which a good gelatine dried at a moderate temperature will not do.

* Continued from page 151.

[1] Wagner. *Jahresber*, 1864, p. 603.
[2] *Dingler's Polytech. Journal*, vol. xcvi., p. 115.
[3] Wagner. *Jahresber*, 1861, p. 632.
[4] *Phot. Correspondenz*, vol. xiii., p. 179.
[5] *Phot. Archiv*, vol. xvii., p. 151.
[6] *Der Kohledruck*, 6th edit., 1877, p. 58. *Notes Photographiques*, Paris, 1878, p. 60.
[7] *Das Pigment Verfahren*, 2nd edition, 1877, p. 22.
[8] *La Photogr. au Charbon*, 1876, p. 27,
[9] *Phot. Monatsblätter*, vol. i., p. 45.
[10] *Phot. Archiv*, vol. x., p. 193.

From the above-mentioned melting points of the swelled gelatine it follows in drying pigment tissue, even when the gelatine of which it is made is good, that one should never exceed 25° C. of heat if one wish all to go well. Geymet and Alker,[1] who fixed the maximum drying temperature at 20° C., because they found that the gelatine often became fluid at 25° C., and Vogel,[2] Swan,[3] and Monckhoven,[4] who do not use a higher temperature in drying than from 20° to 25° C., confirm the correctness of the numbers I have found; so does Rodrigues,[5] who says that good photographic gelatine should become a jelly at 20° or 25° C., or, as he says later,[6] the best kinds of jelly already stiffen at 35° C. Vidal[7] requires of pigment gelatine that it should not yet dissolve or melt in water at 20° or 30° C. If a gelatine film which has soaked until it is quite full of water be freed by pressure from superfluous water it will require a higher temperature to melt it than it would have done while it still contained the latter. For this reason many persons squeegee the superfluous moisture of the chromate bath out of their sensitised pigment paper, so that it may remain[8] undisturbed by a higher temperature than would otherwise be the case.

Most persons agree with Bostock,[9] who found that good gelatine imparts to water containing one per cent. of it the property of becoming gelatinous when cold. I found that it went even further, and that of some sorts of gelatine, which, by Lipowitz's method,[10] are capable of bearing a strain of from 700 to 1000 grammes, only from 0·5 to 0·8 per cent. was required to stiffen the watery solution. Concentrated solutions stiffen much quicker than dilute solutions. This fact is of importance when one coats paper or glass with glue and then wishes to dry it *after* it has set. For photographic purposes (pigment printing, lichtdruck, photogalvanography, &c.), as a rule just so much water should be used for the solution of the glue as it can absorb at an ordinary temperature.

By long-continued boiling with water glue loses the property of jellying when cold. This is a frequent cause of defects in the manufacture of glue, as the manufacturer has the alternative of either by boiling for a short time scarcely getting the good of all his material, or by simmering for a long time extracting the full benefit of it, but in the mean time getting inferior glue. Such glue, boiled for hours, never again jellies so firmly; it melts at a lower temperature than if it had never been subjected to such treatment, and it dissolves more quickly in water. The diminished stability renders such gelatine little suitable for lichtdruck plates, and its low melting-point would stand in the way of its employment for pigment tissue. In fact, Blair[11] lays the greatest stress upon never letting gelatine solutions intended to be used in the carbon process be heated to boiling point, nor be kept for a long time in a melted condition. For Woodburytype and photogalvanography, &c., I believe it may be very useful, and perhaps not without preference over a lichtdruck gelatine, more difficult to dissolve. The glue changed by long boiling with water has almost entirely retained its composition. Goudoever's[12] theory, that in four molecules of gelatine (glutin) one molecule of water is combined, as according to his and Mulder's analyses,[13] seems very probable. Also the addition of acetic acid, dilute nitrate acid, and chloride of zinc hinders the gelatinising of concentrated solutions of glue. Such mixtures of acetic acid and glue are used to produce glue which remains fluid when cold.[14] Dumoulin[15] uses for the same purpose nitric acid, but Balland[16] prefers acetic acid, which preserves the adhesive power better. J. M. Eder, M.D.

(To be continued.)

FOREIGN NOTES AND NEWS.

Dr. Richard on Fog in the Negative Bath.—A New Sort of Charcoal Pencil.—Upon Photographic Irradiation.

In the *Monatsblätter* Dr. Richard has something to say about a simple means of curing the fogging in the silver bath when the fogging is not caused by badly-polished plates. It sometimes happens that the bath begins to fog when sitters have come to be taken, and there is no time to try to doctor it nor to prepare a fresh bath. Such an accident happened some years ago to Dr. Richard, and he was able to get the better of it—not, indeed, by curing the bath at the instant, but by removing the fog from the negatives. He placed the developed but fogged negatives, after they had been well washed, in a place where they were protected from the light, and left them there to dry, which required from thirty minutes to three hours at a temperature not over 15° R. In this way in a single afternoon he has had over a dozen developed plates in the plate-box at a time; these he would develope one after the other, and find that there was no longer a trace of fog remaining that could be attributed to the bath, or, indeed, to anything but badly-cleaned plates.

Dr. Richard's explanation of the sort of fogging which was so easily removed is as follows:—The negative bath may have become saturated with ether and alcohol in consequence of the great number of plates sensitised in it, and then perhaps rather much alcohol may have been in the developer, and thus rendered it impossible to develope the picture fully without fogging. Then by placing the plates, sensitisedi n a bath which thus produces fog, after being developed, to dry in a dark place, they have the chance of giving off the superfluous ether and alcohol to the air—or, in other words, of getting rid of the fog before they are fixed—so that an operator is enabled to get pictures perfectly free from fog with a fogging bath, and to go on working with his old bath until a new one is prepared. The old bath may then be diluted with distilled water and brought up to the proper strength by the addition of the necessary silver. Dr. Richard's explanation and remedy have at least the merit of being simple and easily tried by anyone who is "tried" in the same way.

The *Correspondenz* extracts from the *Papier-Zeitung* a description of a new sort of charcoal for drawing with. The ordinary drawing charcoal is made by charring pieces of wood so that every knot in the wood remains, and there are often scratchy pieces and bits of unequal softness. The new pencils, which have been patented by Herr Heilmann, are made as follows:—Sawdust of wood taken from lime, willow, or even poplar trees, is pressed between wooden moulds having grooves about the size of those made for lead in lead pencils; it is then dried in air and charred in a retort. The hardened sticks are now rubbed smooth, cased in paper, and packed in bundles of twenty-five. The fibres of the wood having been freed from every foreign substance, the charcoal made from it can be moistened with any sort of liquid. Thus moistened with gelatine it can be used instead of black chalk, or it may be moistened with linseed oil, or with lime water. The charcoal is also prepared of a catechu-brown.

It is well known that pictures of intensely-bright subjects are often too broad. This is frequently observable in connection with light hair in enlargements made in the camera. It is also remarkable in the case of astronomical views of the sun, in which the apparent size of the sun varies according to the length of the exposure. The *Mittheilungen* says that M. Angot has made some precise experiments on the origin of this fault, from which it is supposed that it is possible to calculate the amount of the error. M. Angot took several photographs of an object consisting of two right angles separated by a dark space. Exact measurement of the various images taken under different circumstances furnished the following results:—The intensity of the light increases the size of the photographic image. When, however, the light is weaker the image is rather within the geometrical size. Duration of exposure has a similar effect as intensity of light, but there is no proportion between the degree of increase. The irradiation increases also with the sensitiveness of the plate. On removing the stops from the lens, and at the same time considerably increasing the light, it was seen that the images decreased in size as the diameter of the lens increased. Also, pre-exposing the plate exercised an influence on the size of the image. Upon a pre-lighted plate the image is smaller than on a fresh plate. M. Angot finds the explanation of all these appearances in the curvature of the rays of light at the edge of the lens; and, according to this hypothesis, a plate of a certain sensitiveness, and taken with a certain exposure, remains unaffected so long as the strength of the light does not exceed a certain degree.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 10	Glasgow	172, Buchanan-street.
„ 10	Cheltenham Amateur	Savings' Bank.
„ 11	Manchester....................	Memorial Hall, Albert-square.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The usual monthly meeting of this Society was held on Tuesday evening last, the 2nd instant, —Mr. James Glaisher, F.R.S., President, occupying the chair.

The following gentlemen were admitted as new members, viz., Messrs. Charles Harris, H. N. White, F. Wratten, Joseph Webster, William Mansell, Payne Jennings, Newland, W. Field, Nelson, Dale, and Henry Sampson.

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[1] *Gravure Héliographique, Galvanoplastie*, p. 40. Paris, 1870. *Phot. Archiv*, vol. xi., p. 253.

[2] *Phot. Mitth.*, vol. iv., p. 119. *Pigment Verfahren*, 2nd ed., p. 23.

[3] *Phot. Mitth.*, vol. iv., p. 47.

[4] *Praktische Behandlung der Kohle-photographie*, 1876, pp. 6 and 29.

[5] *Phot. Correspondenz*, vol. xi., p. 121. *Bull. Soc. Franc. Phot.*, 1874, p. 150.

[6] *La Section Photographique et Artistique*, Lisbonne, 1877, p. 36.

[7] Vidal. *Photographie au Charbon*, Paris, 1877, p. 51.

[8] *Phot. News*, 1874, p. 408.

[9] *Handwörter-buch der Chemie von Kolbe*, vol. iv., p. 823.

[10] *Handwörter-buch der Chemie von Kolbe*, vol. iv., p. 823.

[11] *Bull. Soc. Franc. Phot.*, 1870, p. 245.

[12] *Annalen Chem. Pharm.*, vol. xliv., p. 65.

[13] *Annalen Chem. Pharm.*, vol. xlvi., p. 206.

[14] *Dingler's Polytech. Jour.*, vol. cxlii., p. 160.

[15] *Dingler's Polytech. Jour.*, vol. cxxvi., p. 122.

[16] *Dingler's Polytech. Jour.*, vol. clxxiv., p. 436.

Mr. T. Sebastian Davis, on behalf of his fellow-members of committee and himself, read the conditions upon which the prize of fifty pounds offered by Mr. Joseph Paget for the best dry process was to be awarded. A statement of these conditions will be found in an article in another page.

It will be remembered that at a previous meeting the silver "progress medal" of the Society was awarded to Captain Abney for having made the most valuable communications to the Society during the past year. This medal was presented to that gentleman by the President, who spoke in terms of great admiration of the value of the various papers contributed by Captain Abney, who, on receipt of the medal, expressed his sense of the honour conferred upon him.

The Chairman then announced the subject for the evening's discussion to be the paper by Dr. van Monckhoven read at the previous meeting. Before calling upon the gentleman who was to open the discussion he stated that he had received a letter from Mrs. J. A. Spencer expressive of the regret of her husband (who was incapacitated from serious illness from being present) at not being able to take part in the discussion on a subject in which he had ever felt the liveliest interest. He (the Chairman) hoped that Mr. Spencer's illness would speedily pass away, and thus be enabled to meet with them all again.

A paper by Mr. W. S. Bird was then read, in the course of which he reviewed the whole question of the fading of the pigments that had been mixed with carbon in tissue for the purpose of modifying its colour.

Mr. J. R. Sawyer read a paper on the same subject by Mr. J. W. Swan, of Newcastle-on-Tyne, and also made some lengthened remarks in the same direction. But, however, until the publication of Mr. Bird's paper and that of Mr. Swan the various remarks which followed would not be understood; hence we defer this portion of our report for a week. Those who made observations on the matter were Mr. Samuel Fry (who announced his intention of using silver printing for all small work in preference to carbon); Colonel Stuart Wortley (who combated some of Mr. Fry's ideas); Mr. Bolas (who spoke of certain experiments made by him with the oxides of iron); and Mr. Spiller (who alluded to the fact of there being six shades of alizarine now prepared).

The Chairman proposed the thanks of the meeting to the various gentlemen who had contributed to the information of the members on this subject.

A paper on *Dry Processes* was to have been read by Mr. William England; but, owing to the lateness of the hour to which the previous discussion extended, the Chairman announced that it would be deferred till next meeting, which will take place on the 14th prox.

The walls of the gallery were adorned by a very large and choice collection of works executed and exhibited by the Autotype Company, and a special vote of thanks to this Company was proposed by the Chairman. After the exhibition of some of Mr. Dallas's most recent works in Dallastint the meeting was adjourned.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

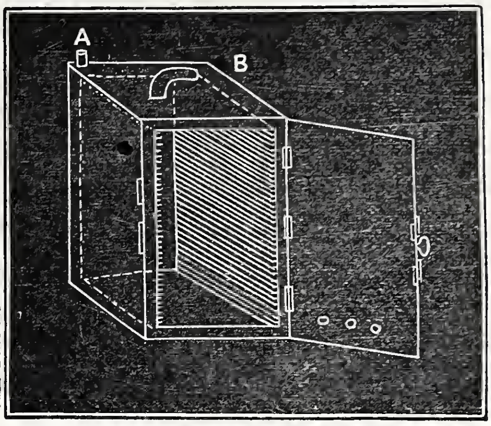
The monthly meeting of this Association was held on Thursday evening, the 28th ult., at the Free Public Library, William Brown-street,—Mr. H. A. Wharmby, President, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. J. C. Forrest was elected a member of the Association.

A communication was read from Mr. J. A. Forrest stating that, as this was an age for exhuming old photographic ideas and dressing them up to the times, he had sent some pictures treated in the following manner:—Take a strongly-printed photograph on paper and saturate it from the back with a rag dipped in castor oil. Carefully rub off all excess from the surface after obtaining thorough transparency. Take a piece of glass an inch larger all round than the print, pour upon it dilute Russian glue, and then squeegee the print and glass together. Allow it to dry, and then work in artist's oil colours from the back until you get the proper effect from the front. The examples sent showed that both landscapes and portrait could be effectively coloured by the above method without any great skill being required.

The exhibition of Mr. J. H. T. Ellerbeck's drying-box excited considerable discussion as to which was the best form and mode of heating drying-boxes. Mr. Ellerbeck described his drying-box as follows:—In a chemical laboratory is used a water oven for drying precipitates, &c., at a certain temperature. Finding a want for drying plates quickly, and at the same time away from light and the action of deleterious fumes, I have made on the same principle a water oven for this purpose, differing only in having in the inside, instead of one shelf, a number of ledges for the reception of the emulsionised plates. As this apparatus may not be much known a slight description may be serviceable to some. A Milner's safe is a good model. It consists of a double box of metal, with an open tube at top for the admittance of water, which surrounds on all sides, except the front, the inner case, the sides of which are shelved or grooved the same as an upright plate-box. From the top of the inner chamber is a pipe leading to the outer atmosphere for the escape of fumes and to cause a current of warm air throughout. To effect this more advantageously I have made the box two or three inches deeper than the plate itself, so that when this latter is inserted it will be that distance away from the entrance. If the next plate be placed flush with the door, and each alternately in and out, the hot air is made to pass over each plate to its full length. The drying thus takes place in a few minutes. I have made mine for thirty-two plates, but this is hardly necessary, for amateurs do not usually make this quantity in a night. Still it is best to be on the safe side, and the extra space allows all to be left till the evening's work is done, and you need not stop in the middle to put away those already finished. The whole had better

Hot Water Oven for Drying Plates.



A—Inlet for water. B—Outlet for vapour or hot air.

be of copper, when it will last a lifetime. Tin is, of course, cheaper at the first but dearer in the end, as being liable to rust and wear out. The diagram will show better than any description the plan. The distance between the inner and outer metal need not be an inch, and a thermometer can be fixed with the register outside for any delicate work. Gelatine workers will find this oven of value if the shelves are properly levelled, and it will be found useful for many other purposes, such as drying chemicals, evaporations, &c. The heat can best be kept up by a gas boiler to any required temperature.

The Rev. H. J. Palmer then gave a practical demonstration of his method of preparing and developing the "Palmer" films, which was watched with the greatest interest by the members. [See page 159.]

The demonstration was also illustrated by a number of film negatives, showing conclusively their excellence and portability.

The receipt of the *Bulletin Belge* and the *St. Louis Practical Photographer* was announced by the Secretary.

After votes of thanks had been cordially given to the different exhibitors, a large number of transparencies were shown by the aid of the Society's lantern. Some from albumen plates by Mr. Lund, of Manchester, and some of animals taken on Kennett's gelatine plates by Mr. L. W. Weber, were greatly admired.

The meeting was afterwards adjourned until the 25th instant.

PHOTOGRAPHIC SOCIETY OF VIENNA.

A meeting of this Society was held on the 5th February,—Dr. Hornig occupying the chair. The usual routine business having been despatched,

The Chairman read a communication from the Lower Austrian Industrial Association, in which it was stated that that Association had supported by a memorial the Photographic Society's application to the Minister of Commerce for a revision of the regulations affecting the transport of collodion; at the same time he mentioned that the Austrian Engineers' and Architects' Association had not complied with his request for similar support. He (the Chairman) also said that by the intervention of the President a committee of the Chamber of Commerce was appointed to consider the question, and it was decided that collodion cotton might be sent by rail. He had also received a letter from the Minister of Commerce in which he promises to bear the point in mind at the forthcoming readjustment of regulations for railway traffic.

The first number of a new technical journal, the *Oesterreichischen Gewerkzeitung*, was laid on the table by Dr. Hornig, along with a proof sheet of Herr Bolhoever's *Münicher Renaissance.*

Some of Herr Wilde's emulsion plates were then shown, and the Chairman asked if any member would try them and report to the Society the degree of success he had met with. Dr. Eder and Captain Tóth undertook to make the requisite experiments, the former at the same time calling attention to the article on Wilde's emulsion process which appeared lately in the *Mittheilungen.*

Herr Oscar Kramer gave an account of the progress made during the last two years in the *lichtpaus* process in his establishment. During the last eight months the Salz-kammergut-Bahn has used about 10,000 *lichtpaus* pictures, principally as a quick means of multiplying plans for carriages, locomotives, &c. Paper for *lichtpaus* is sensitised by the cyanotype process, by a machine, in rolls of from 100 to 200 metres long, and sold in rolls ten metres long, and sixty-five, seventy, and seventy-five centimetres wide. In many parts of Germany a sensitive fluid is sold which is applied to paper with a sponge or a brush; but, as some difficulty is experienced in applying it, the rolls are more convenient, being equally sensitised, and it not being necessary to unroll more than the quantity it is desired to cut off.

By request, for the last nine months Herr Oscar Kramer has produced, from direct prints, pictures with dark lines on white ground by Willis's aniline process. The pictures are very successful; but paper prepared for the purpose cannot be sent into the market, as it only keeps for a few hours, while that prepared by the cyanotype process, besides being easily used, keeps for half-a-year. Herr Kramer showed, from a single original, prints upon paper and upon cotton both by the cyanotype and aniline processes, and also very good prints upon cotton from photographic negatives.

Dr. Eder asked whether cyanotypes did not always fade with exposure to light.

Baron Schwarz-Senborn, Dr. Böhm, and Herr Kramer replied that, on the contrary, they had observed an increase of density in the blue tones, which, after some discussion, was attributed to a residuum of the chemicals which had not been washed out.

Herr Kramer also said that a great deal depended on the proper choice and mixture of chemicals. The raw paper he used was the same as that on which the Austrian bank notes were printed.

After a little more discussion the matter of *lichtpaus* processes was dropped.

Herr Fritz Luckhardt showed a box or bath for acids made of pressed glass, in which there were grooves, so that the plates, when being treated with acids, could not be shifted about. This bath is only made in one size at present, but Herr Luckhardt supposed it could be made to order in larger sizes.

The following question, taken from the question-box, was then brought under the consideration of the meeting:—"In order to avoid the wearisome labour of polishing glass when on a journey, and also to cause the dry collodion to adhere better to the glass, I albumenised my previously carefully-polished glass plates before I set out for my summer tour. The plates when exposed were in the dark tent developed with iron, intensified with pyro. and silver, and after being washed with a four-per-cent. solution of potassic iodide, in order to prevent the further action of the intensifier, they were rinsed with water and dried. After a stay of about a fortnight I returned home and fixed the plates with hyposulphite of soda, which made the black parts somewhat lighter, and the dark parts were then seen to be sown, as it were, with minute dark blue spots. These spots showed most in lights of the sky when the light fell directly upon the plate, and I thought it would be necessary to stop out the whole of the skies of all the plates. Happily, however, I found by the prints that the actinic action of these dark blue spots was exactly the same as that of the surrounding black parts, and that they did not show at all in the positive picture. My question is, therefore, are these dark blue spots a peculiarity of previously-albumenised plates, which I have not seen described in any work on photography, or should the cause of their appearance be looked for somewhere else? Perhaps the sulphur contained in the albumen is to blame."

It was regretted that the question was not accompanied by a specimen negative, and a member remarked that the spots were most likely caused by the plates not being properly polished at first, or from some particles of dust having adhered to the coating albumen.

Herr Luckhardt took the opportunity of observing that nowadays the photographer had often to contend against bad glass as well as against bad albumenised paper and mounts.

The business of the meeting was shortly after brought to a close by the Chairman handing over his office for a time to Herren von Melingo and Luckhardt, and bidding the Society good-bye, previous to his departure for Paris, where he is one of the Exhibition Commissioners for Austria.

THE PHOTOGRAPHIC SECTION OF THE AMERICAN INSTITUTE.

The December meeting of this Society was presided over by Mr. H. J. Newton.

Mr. O. G. Mason (the Secretary) remarked that his attention had been called within the past few days to a chemical fact that might be classed as a discovery. They had always been told in books on chemistry that chloride of gold contained in its pure state forty-nine per cent. of metallic gold—they had it as a terchloride of gold—and that it always contained three atoms or molecules of water. But it had lately been found that pure chloride of gold contained but forty-five per cent. of metallic gold, and instead of three molecules of water it contained forty; consequently when they estimated the cost of prints they found that they could make more prints with $10 00 worth of metallic gold than they could with the estimated quantity as sold. That is, the best chloride of gold contained less metallic gold; and if the water of crystallisation were driven off to the fullest extent without decomposition, it still contained four elements of water. This, he thought, an interesting fact for photographers. Gold, as they bought it, was usually warranted to contain seven and a-half grains of metallic gold in fifteen grains of the compounded salts.

Mr. D. C. Chapman stated that at the last meeting there was much said on the subject of coloured light. It was stated that one member said he made a picture with blue glass much quicker than without it. Now he doubted that statement. The only effect the blue glass produced was to absorb some of the light from the picture, and the contrast of some portions was thus rendered greater; the outlines were stronger, and therefore a contrast was got which was not found without the glass. There was no such thing as primary colour. It was one continuous stream of wave lengths for the space of an octave. There was no such thing as a fixed colour. Every different length of vibration of light gave a different colour. He had been all over the ground, and knew what coloured light would do. When light passed through blue glass some of the rays of light were stopped. What they called white light was nothing but a confusion of all the wave lengths, which pressed on the optic nerve. For instance, if the waves were waves of 300,000, the eye was acted upon by waves of that length. Light passing through blue glass was not changed, and acted on the chemical substances the same.

The President remarked that colour was purely a sensation. The varying colours were the result of the peculiar excitation of the optic nerve by different wave lengths, which were conveyed to the sensorium or perceptive faculties. The result of that excitation and perception was what they called colour. The position assumed, as he understood it, was that the light from the subject to be photographed, having a variety of colours, was modified or changed in its passage through a coloured medium to the ground glass; that yellow appeared green, &c. The question was, whether the eye was a correct interpreter of the different wave lengths or not; and if the yellow were actually changed to green, or simply if it were an illusion. He (the President) could not adopt the idea that blue light would photograph quicker than white light, unless it could be shown that the white light, in passing through a blue medium, had some retarding agent filtered from it in the passage. All the blue rays being contained in white light, such a proposition would be equivalent to saying that a part was equal to the whole.

Mr. Chapman said that when a camera focussed on a yellow light behind blue glass it was focussed on the yellow light that came through the glass. It was a yellow image just as it was before. Now if they interposed a prism, they separated the yellow and the blue. The camera was not deceived by the coloured glass. The image was not composed of green light. All light except that which came from the sun was reflected light, and no matter what was interposed between the light was reduced in power.

The Secretary remarked that he had green and orange, and green and ruby, in his dark-room windows. The ruby glass would stop all the actinic light. A piece of ruby-coloured glass might be placed over photographic paper and put in the sun for a week, and the paper would be white still. By blue light he produced more harmonious pictures than he had been able to do by the use of any other tints.

Mr. Chapman said the only advantage blue light had was that it was more comfortable to the sitter, and a more composed, natural, expressive picture was the result.

Mr. J. Chisholm remarked that with blue light and a long exposure he thought he got a better picture.

The President said that his impression was, from the experience of others, that for copying oil paintings the blue light possessed an advantage.

The Secretary claimed that blue light would make a more harmonious picture than could be had without it, for the reason that the chemicals recognised a difference and worked under more favourable conditions. But one great trouble encountered in the use of blue light was that too great a quantity was used. The proper shade was of much importance. By looking at a yellow object through blue glass it looked green, and red seen through blue would appear purple. The question was—Did they, by interposing the blue, change the red into a purple, which was a more actinic colour? There seemed to be no doubt, in his mind, that the interposition of blue glass of the proper tint did accelerate the work and add to its intrinsic value. He was aware that he stood alone on that ground, yet he proposed to hold his position until driven off by clear demonstration of its no longer being tenable.

The meeting was then adjourned.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

A meeting of the above Society was held on the 1st February,—Dr. Vogel in the chair. Four new members having been admitted,

The Chairman placed on the table some portraits by Rocher, of Chicago.

Herr Hartmann called attention to their remarkable sharpness, saying that he believed them to have been taken with a Dallmeyer's rapid rectilinear lens.

A reclamation on behalf of Mr. Walter Woodbury was then lodged, in which it was stated that the dark slide for emulsion paper exhibited to the Society by Mr. Warnerke was constructed on a principle previously published by the reclaimant, Mr. Woodbury. The communication also contained the description of a process for obtaining bird's-eye photographic views by means of a camera fixed to a captive balloon, and furnished with a dark slide containing a roll of emulsion paper. This roll is moved by means of machinery worked by an electric current from the earth. It is not necessary for anyone to go up in the balloon.

The CHAIRMAN remarked that however chimerical this idea might appear, it contained nothing impossible, he himself having already seen in America views taken from a balloon. Mr. Black, of Boston, took a view of that city from a balloon upon a wet plate, which was sufficiently sharp to allow of the principal buildings in the town being recognised. According to recent experiments it would appear that they need not despair of getting similar instantaneous views upon dry plates under favourable circumstances.

Herr ZIPSER gave an account of his experiments with Husnik's dusting-on solution. The solution was diluted with three times its volume of water, then poured upon a clean glass plate, dried with heat, and placed while still warm in the printing-frame with the negative to be reproduced. In the printing-frame it received an exposure sufficient to get a good carbon print from the negative used. The picture was then developed by having the prepared graphite dusted upon it. The process was very similar to that of Herr Obernetter. Herr Zisper showed the results he had obtained by the process, but he was not very well satisfied with them, and he said it was less trouble to reproduce the negative by the carbon process than by Husnik's process. Herr Husnik, he might mention, recommended that the plate be rubbed with a dilute solution of water-glass, and that one should breathe upon it before pouring on the dusting-on solution.

Herr JOOP had also tried Husnik's solution, and expressed himself pleased with the results. Instead of water-glass he had treated the plates with alcohol and glacial acetic acid, and did not breathe upon them, as he found that it changed the temperature of certain parts. He also remarked that, when drying, the plates should not be placed in a draught.

Herr BECKER said the negatives so obtained were reversed, and he had not been able to draw them off and turn them over. He had coated the picture with raw collodion, let it become perfectly dry, then laid it in acidulated water, and when he tried to draw off the picture half of it stuck to the plate while the other half came off with the collodion.

The CHAIRMAN had never found any difficulty in drawing off the negative, but he thought the collodion should not be allowed to become dry, but only to stiffen, and should then be placed at once in the water.

Herr JOOP described his present manner of developing carbon prints. When the pictures were removed from the pressure-frame they were first dipped into cold water and then squeegeed, being then placed for about a minute in a two-per-cent. alcoholic solution of white shellac. Afterwards they were again squeegeed in the usual manner on a glass plate, and about a quarter of an hour after they were developed.

Herr LIEBMANN worked on the same plan, but used a shellac solution at least one-per-cent. stronger.

The CHAIRMAN pointed out that the *New Lichtpaus Process* described in a Swiss technical journal is merely Willis's well-known aniline printing process. He (the Chairman) took this opportunity of pointing out that when an application for a patent was received and taken into consideration at the patent *bureau* that was by no means, as some people seemed to suppose, the same thing as granting the patent. It merely meant that the application and specifications were to lie in the patent office for eight weeks until inquiry could be made as to the real novelty of the invention, after which, if the results were satisfactory, a protection would be granted for five years. Some other people in describing an invention did not merely patent the new part, but included parts of the process in common use before. Thus, in the specifications of a process for producing photographs on textile fabrics by electric light, a deseription is given of the method of salting and silvering the fabric and of toning and fixing the pictures, though these last processes are not new and have often been employed, so that the labours of the testing commission are by no means light.

The question-box contained but one query. A member wished to know whether there was any truth in the paragraphs going the rounds of the papers as to the remarkable influence of coloured light upon lunatics.

The CHAIRMAN said, in reply, on the authority of Dr. Levinstein, director of the *Maison de Santé*, at Schöneberg, that the plan of acting on the minds of lunatics by means of coloured light had never been tried in earnest by medical men who made madness their study, and that the *whole* thing was *humbug*. He (the Chairman) then reported that Dr. Eder and Captain Tóth's report on chrysoïdine in the last number of the *Archiv* was less unfavourable than that in the former number; but their experiments were made with bromide of silver emulsion, which differs in sensibility to violet and dark blue light from ordinary iodide of silver wet plates. He (the Chairman) had made his own experiments with the latter, and found the action of the chrysoïdine upon it much less favourable.

The conversation next turned upon disturbances in Eder and Tóth's intensification with lead.

The CHAIRMAN remarked that when plates intensified unequally it would often be seen that the cause lay in their having been allowed to become dry, or half dry, before being laid in the lead bath. The plates ought to be placed in the lead bath wet, immediately after being fixed and carefully washed.

Herr SCHAARWÄCHTER stated that his plates intensified in the lead bath often sprung off the glass during the drying.

The CHAIRMAN said that had only happened once to him. For a year back he had intensified with lead almost daily, and got the best results.

Herr JACOBI remarked that by intensification with lead the fine lines were easily veiled.

The CHAIRMAN said that that could easily be prevented if the shadows were kept clear, for which end a drop of nitric acid should be added to fifty centimetres of collodion. He (the Chairman) then intimated that on January 22nd a meeting had been held of those persons interested in the proposed exhibition to be held at Berlin in 1879. A committee had been chosen, of which he was a member, and they might rest assured that he would do all in his power to further the interests of the Society. At the exhibition photography is to be classed with prints. The exhibitors will be limited to Berliners.

Dr. Weissenborn read an extract from the annual financial statement of the "Dresden United Manufacturers of Photographic Papers," from which it appears that the company will pay its shareholders a dividend of ten per cent,, making, with that already paid, sixteen per cent. for last year, as against seventeen and two-thirds, fifteen and a-half, and twelve and a-half per cent. in previous years.

On the motion of Herr Leibmann it was resolved to hold a second social meeting in March. The meeting was then adjourned.

Correspondence.

PHOTOGRAPHY IN CEYLON.

To the EDITORS.

GENTLEMEN,—Enclosed I beg to hand you some photographs of sunset effects, also some of the burst of the south-west monsoon in May of last year.

I have had two or three "goes-in" at carbon, but except once I have not done much at it as a rule. I sensitise a batch of tissue at night, and on the following day, if I have no appointments, I can get through all right; but I am sure to be called away at some point or another, or else get an order to go out somewhere, and there you are!—the tissue is spoilt.

I am still using the collocine, and have tried it several times against glacial acetic acid, the result being always the same, viz., the collocine gives a quicker and better image. You remember how I use it, namely, one ounce of collocine to seventy-five ounces of water. I use this exactly as I would acetic acid.

I often wish that you could have twenty-four hours of our sun once a week in exchange for a like period of cold weather; but really, as a fact, the heat here is not oppressive unless you are sitting down indoors, or standing in the sun in dark clothes without an umbrella. For myself I have plenty to do, and although life here is monotonous it is very pleasant, and time flies very rapidly.

We had a rather curious phenomenon here last week. At about three o'clock the sky was overcast, the sun shone through the clouds, and was of an orange colour. Although the light was almost as bright as before, the exposure required for a plate was about five times more than it ought to have been.

With kind regards to all my old friends,—I am, yours, &c.,

Colombo, Ceylon, March 4, 1878. W. T. WILKINSON.

[The prints sent by Mr. Wilkinson are singularly fine, the combinations of sea and sky being most attractive. In the "monsoon" views the sea is seen in the picture dashing over a pier as a cloud of spray.—EDS.]

NON-CONVERGING PERPENDICULARS.

To the EDITORS.

GENTLEMEN,—Will you kindly inform me, and probably many other readers, if the nature of the perpendiculars in a photograph is affected by the kind of lens that is employed in the production of a picture, and, if so, to what extent.

It has been clearly shown by those who have so recently written on this subject that distortion ensues if the camera be pointed upwards, causing the convergence of the perpendiculars. Now what I wish to know is this—is this the case with *all* lenses, or only with those known as distorting or single lenses?—I am, yours, &c., MEDICUS.

Hornsey Rise, April 3, 1878.

[No matter what kind of lens is employed the perpendiculars will converge if the camera be tilted, the amount of convergence corresponding with the extent to which the tilting takes place. In the case of a non-distorting lens the lines of the perpendiculars (whether converging or not) will be straight; with a single lens they will be slightly curved.—EDS.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Wanted to exchange, a skylight and dark room, for *Bigelow's Album* in good condition.—Address, G. Brown, 8, Madelaine-street, Prince's Park, Liverpool.

Ross's No. 3 symmetrical, 5 inches focus, will be exchanged for a ditto an inch longer in focus; value adjusted.—Address, S. S. Crewdson, Union-street, Ulverston.

I will exchange a folding-tent, and wheels for moving it, for two or three good posing chairs or useful accessories for studio.—Address, Geo. Collins, 130, Culford-road, N., Kingsland, London.

ANSWERS TO CORRESPONDENTS.

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

*** Reviews, &c., in our next.

Robert Whitehouse.—By "sal soda" is meant common washing soda.

W. S. Barker.—The tone of the transparency can still be modified and improved by placing it in a weak gold toning bath.

Rev. T. P.—The credit of the discovery or invention (whichever you like) is due exclusively to Mr. M. Noton, of Manchester.

Engraver.—While it is our intention to give full working directions for the process, some time will yet necessarily elapse before it can be done.

Obliged Reader.—Nos. 1 and 2 in your list, although by different makers and bearing different names, are in reality alike both in principle and construction.

M. E. E.—Either your light is too concentrated or you under-expose the picture. Try a longer exposure and a developer that is more diluted before deciding upon altering the roof of your studio.

L. G. B. (Gray's Inn).—The streaks on the negative are caused by the bath being out of order—probably from the presence of organic matter. The remedy in such a case will consist in neutralising and sunning.

Oxon.—If you are again so unfortunate as to stain your coat by means of acid lose no time in pouring a little ammonia upon the red stain, by which it will, in most cases, be reconverted into its original black colour.

Australia.—The photographic trade is said to be no better in Australia than it is in this country. We would not risk offering you advice under the circumstances. There are no local photographic journals published in Australia; we, at anyrate, are not aware of any.

T. O. B.—Seeing that (contrary to the experience of others) the use of French chalk does not facilitate the transfer of the collodion film, you may try the effect of giving the plate a coating of a weak solution of wax. Describe to us in what manner you proceed, and we may then be able to help you.

J. M.—By increasing the strength of the sensitising bath till it contains not under forty grains to the ounce, and by then adding a few drops of nitric acid, the evil of which you complain will be remedied. From the offensive smell of the paper we infer that it must have been prepared with very old albumen.

W. W. W.—The bronzing in the shadows may be got rid of by reducing the strength of the exciting bath; but the bronze that appears in patches on the plain piece of paper is owing to some surface defect. The paper has, perhaps, been handled by some one whose fingers were dirty. Try the effect of using another sample of paper.

P. S. J.—1. You will obtain all that is required by purchasing an ordnance survey map of the locality, and photographing just so much of it as serves to illustrate your lecture.—2. The lantern transparency ought to be produced on a plate exactly three and a-quarter inches square. Cushion-shaped mats will best suit your purpose.

S. Y. L. L.—While the portraits, as photographs, are well executed and technically perfect, there is a very unpleasant expression in most of them. This is somewhat difficult to account for, unless on the supposition of your being somewhat "grumpy" when posing your clients, the expression upon your own face influencing those of the sitters. Can *you* account for this peculiarity otherwise?

G. S. Smith.—First of all produce an over-intensified transparency, then, after fixing, tone throughout its entire substance with a weak solution of chloride of gold, wash, transfer to the porcelain plate, and place it in the muffle. This will yield a picture of the kind desired; but you may modify the process by toning the image in chloride of platinum or of iridium, or of a mixture of either of these with gold.

L'Etude.—Let the interior be painted a pale blue colour, and avoid thick window bars. Let the latter be thin and deep rather than thick. For the rest see that your assistant is supplied with a lens of large aperture and short focus, and you may commence as soon afterwards as you choose to issue the proposed advertisement. You will, of course, have carefully considered the wisdom of making a speciality of photographing children.

Capt. Young.—Among the useful tables given in each issue of our Almanac you will find one devoted to the subject about which you write. The table—that having reference to the production of enlargements—is so constructed as to afford all the explanation required. If after perusing it you should find your proposed course still "misty," write again and give full details. This we think, however, you will not require to do.

Atelier.—1. A collodion transparency may very easily be transferred to canvas, and it is occasionally done by specialists in the transfer process. The method you propose for doing so will answer quite well, but the squeegee will not be required.—2. We think that the roller-and-cord system will prove most convenient. If properly fitted up it need not prove inelegant.

G. B. Hudson.—Procure, or make, a small view-meter, and let it be your companion when out for a walk. If it be adjusted to embrace precisely the amount of subject included on the ground glass of your camera you will soon acquire facility in estimating with considerable accuracy, and, eventually, *without its aid*, the extent of any subject or landscape which can be photographed from any particular standpoint.

Amateur.—The Dry-Plate Club has ceased to exist. So far as we are aware the Amateur Field Club is the only one of the kind devoted to outdoor photography in a social capacity. The Solar Club was organised and continues as a social dining club. If you call at our office we can give you the address of several amateurs who will be glad to accompany you on your proposed Saturday excursions "out and about" with the camera.

J. F. F.—Having made a strong solution of soda or potash in boiling water, immerse therein the brass mounts from which you wish the lacquer removed. If the solution be hot and strong an immersion of about a minute ought to prove quite sufficient. If you have access to a turning-lathe "chuck" the mount, and give it a final polish with rotten stone and oil, using a woollen cloth for the purpose. This will impart a beautiful finish.

A. Conlon (Lincoln) says he is about to proceed to the continent, and wishes to take with him a camera and a few dry plates. He wishes to know how he can best pass his plates scatheless through the Custom House. He proposes going *via* Newhaven and Dieppe to Paris, and from thence to Nancy, Meurthe, Moselle. If any reader happen to know any places of interest within easy reach of that town he should feel obliged by being informed of them.

Old Professional.—The yellow, or even orange, glass at one time so commonly made use of in glazing the windows of the dark room of the professional photographer will prove quite inadequate to the requirements of the bromide emulsionist. Read what Mr Bennett said on this subject in our last number, and accept our assurance that he has not overrated the importance of working with a minimum of a strong ruby-coloured light. Begin the study of sensitive bromide emulsions by discarding the preconceptions derived from your wet collodion experience.

Orion (Blackheath).—When we stated that triplets were usually constructed with larger apertures than doublets we merely stated a fact that was generally recognised at that time. The term "doublet" in that assertion did not apply generically, but had reference to a certain article of manufacture bearing that as a trade designation. Since that time the term is recognised in a broader sense, and cemented doublets have undergone a great change. The manufacture of the triplets there referred to has also been discontinued. Many improvements in lenses have been effected within the last thirteen years.

Fusible Metal.—In our article last week *On Blocks for Woodbury-type Printing* we gave several formulæ for the compounding of fusible alloys. In the one made use of by Mr. Thomas Bolas in his lecture at the Society of Arts we gave as an ingredient "one part of nickel." This is an error; it ought to have been one part of *cadmium*.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.
For the two Weeks ending April 3, 1878.
These Observations are Taken at 8.30 a.m.

March.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
21	30·31	W	45	48	57	46	Dull
22	30·02	N	36	40	45	38	Cloudy
23	29·78	NW	31	34	44	29	Cloudy
25	29·64	N	—	35	45	29	Dull
26	30·31	NW	33	35	48	29	Foggy
27	29·81	N	36	38	50	33	Snow
28	29·58	E	36	38	45	34	Dull
29	29·20	E	34	34	38	32	Snow
30	29·28	N	32	35	43	32	Fine
April.							
1	29·14	NW	—	35	48	29	Cloudy
2	29·30	NW	37	41	52	31	Fine
3	29·56	N	41	43	44	37	Dull

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 936. Vol. XXV.—APRIL 12, 1878.

THE FERROUS OXALATE DEVELOPER.

Since our last reference to this subject we have had ample opportunity of trying the new developer under almost every variety of circumstances, and are now in a position to speak more decidedly of its capabilities than was the case when we last mentioned it. We have placed it in direct competition with alkaline pyro., and are able to confirm all that has been previously said with regard to the remarkable energy of its action. A variety of experiments have also been made with a view of finding a suitable restrainer to be used under circumstances which render the solution in its normal state too powerful; but, in this direction we have not been able to attain complete success.

The most noticeable feature in connection with this developer is the extraordinary rapidity with which it performs its work. Whatever may be the exposure the plate has received the full effect of the developer appears to be produced at once; that is to say, the time occupied in bringing out the whole of the detail it is possible to secure with a given exposure is as short, or shorter, than would be necessary with a wet plate and iron development. In this respect it offers a marked contrast to most other developers, strongly alkaline pyro. presenting the nearest approach to similarity. Under-exposure does not, as in other cases, produce a slow and gradual development; but, though the characteristics of the finished negative may resemble closely those of an under-exposed plate developed by other means, the development is as rapid as if a full exposure had been given, and no continuation of the action of the solution appears to be capable of bringing out further details.

This peculiarity in its action may possibly in many cases lead to the formation of an exaggerated idea of its power; for rapidity of action and energy have hitherto been so closely allied that it is not improbable the *searching* power of a prolonged development under favourable circumstances may be overlooked. For practical purposes we take it that the energy of a particular form of development is represented by the amount of detail it is capable of producing with a given exposure, and irrespective of the time occupied in the developing operation. Of course, other things being equal, we should give the preference to that solution which produced a given result in the shortest time; but, however rapid its action, we should hold it inferior to a slower developer capable of rendering a fuller amount of detail. Viewing ferrous oxalate from this point, we were at first inclined to believe that its powers had been overrated; but, after a number of careful comparative trials, we have been forced to the conclusion that it does undoubtedly shorten the exposure, though, perhaps, not to the extent which some claim for it.

Owing to the unfitness of the weather for outdoor work many of our early experiments were made upon transparencies, in which branch the extra sensitiveness arising from the use of the new developer is not very apparent; it may be noticed, indeed, that the gain in that direction only becomes evident when the solution is tested to its utmost by extremely short exposure. For instance: if we expose a plate sufficiently long to give a good result with alkaline pyro., it will be found that a similar plate exposed for the same length of time, but developed by means of ferrous oxalate, will exhibit no trace of over-action; in fact, the exposure may be considerably increased without producing such an effect, which argues greatly in favour of the elasticity of its powers. The absence of any fogging tendency no doubt contributes to this result, as, unlike alkaline pyro., especially when used strong, the new developer is not liable to veil the transparent parts or render heavy the shadows of a transparency if the exposure be a little overdone.

Thus with a certain negative we found that an exposure of ten seconds to a gas flame sufficed to give a fully-printed transparency when a moderately strong developer of pyro. and ammonia was employed. Under similar circumstances, but substituting for the pyro. a mixture of one part of saturated solution of ferrous oxalate to two parts of water, the resulting image differed only in colour, though it perhaps exhibited a generally softer appearance without showing any increase of detail. Up to twenty seconds' exposure the results obtained were satisfactory, but beyond that point gave strong evidence of over-action. Upon gradually reducing the exposure we found that no detail was lost until it had been reduced to two seconds. With three seconds' exposure all the detail exhibited by the alkaline developed plate with ten seconds was present; the general appearance of the image was cleaner and more crisp without showing any sign of under-exposure. A nearly similar result as regards the amount of detail brought out was given by alkaline pyro. in five seconds; but the finer detail in this case was extremely feeble, and the general appearance of the picture crude and incomplete.

These experiments were, so far, decidedly in favour of the new developer; but as we can scarcely accept transparency printing as a fair test of the power of a developer for landscape work, we seized the first opportunity of applying a more complete test. A dry emulsion plate was exposed for three minutes upon a bright clear day about the middle of February, the subject being houses and broken ground in the foreground, with a background of trees. Developed with pyro. and strong ammonia a vigorous and well-exposed negative was the result, the naked branches of the trees forming the background being perfectly rendered, though with little strength. With two-thirds of the exposure ferrous oxalate gave a better result—better inasmuch as the fainter portions possessed greater vigour—and produced a more harmonious negative.

A wet emulsion plate was then exposed for thirty seconds upon the same subject, the resulting picture, under alkaline development, being a decided improvement upon the similarly-treated dry plate. With twenty seconds' exposure ferrous oxalate produced but a feeble and apparently fogged picture, and it was only by reducing the time to *five seconds* that a clean and passable result was obtained; but even then it was inferior to the image secured with alkaline pyro. This difference in the behaviour of the developer upon wet and dry plates appears rather remarkable, and would seem to lead to the idea that in the open and permeable state of the wet film its reducing action, at least at the strength we employed it, is too powerful. We may remark that there was nothing in the preparation of the wet plates which would interfere in any way with the working of the ferrous oxalate. The same emulsion was employed as in the preparation of the dry plates, and after coating the plate it was merely washed under the tap to remove the ether and alcohol, no preservative of any sort being used.

Another peculiarity in the behaviour of the ferrous oxalate may be mentioned, namely, that it appears to act less favourably in a strong light, or when the subject offers little contrast, than when the opposite conditions prevail. Thus for cloud subjects we have found it wholly useless, as, however short the exposure, a general veiling of the whole plate occurs, as if from the action of diffused light in the camera, and no variation in the strength of the solution appears to materially affect the result.

This leads us to the subject of restrainers, and we are compelled to confess that, so far as the addition of any extraneous matter to the solution is concerned, we have been wholly unsuccessful in this direction. Large additions of sulphuric, citric, or oxalic acids, or of solution of bromide of potassium produce no effect beyond slightly retarding the *commencement* of the development; once commenced it proceeds as rapidly and produces as full an effect as when no restraining agent is employed. The only means which have proved at all successful in modifying the action of the solution consists in using it in a state of considerable dilution, when the effect is, as might be anticipated, much less energetic and more easily controlled, without any apparent diminution in the developing power. It is to be remarked, however, that as the strength of the solution is diminished so does the density of the image become less; and, though the same amount of detail may be brought out, it is proportionately weaker and more difficult to work up to printing density. The strength we have generally employed is one part of the saturated solution to two of water; but the quantity of the latter may be increased to eight, or even ten, parts without losing working properties.

We have so far spoken only of development proper, and we may now say that, so far as our experiments have gone, we have been unable to trust entirely to ferrous oxalate for the production of printing density. For transparencies a sufficiently strong image is easily obtained, though the colour is not generally satisfactory; but for negative work we have found silver intensification a necessity. With a film of pure bromide the silver appears to deposit with greater difficulty when ferrous oxalate is used than when the preliminary development is performed with pyro.; but the presence of a very small proportion of iodide in the film entirely removes this difficulty. The iodide does not seem to alter the characteristics of the image produced by the iron salt, but when the intensifying solution is applied it appears to attract the deposited silver more readily.

In a future article we shall have something to say on the effects produced by variations in the strength and mode of preparing the solution.

DRY PROCESSES—ANCIENT AND MODERN.

I.—COLLODION WITH ALBUMEN.

It is now ten years since we, in the course of a few chapters entitled *Dry Processes for the Approaching Season*, and in which we described a few of the many processes then practised, said:—"It is unquestionably a fact that the majority of our best dry-plate workers prefer those processes in which albumen is united with the collodion film." But since that period dry-plate photography has made great progress, and the unquestionable "fact" of April, 1868, has ceased to be a fact in 1878; for which we are in no small degree indebted to Mr. W. B. Bolton, who, by the introduction of his washed emulsion process, has raised to a position of great popularity this the simplest of all processes.

Nevertheless, there is a well-marked predilection shown by many for processes in which albumen is called to play a part; and, although it is true that not one of the somewhat extensive family of collodio-albumen processes can for a moment compare with washed emulsion in its general convenience and facility of utilising, yet, yielding plates possessing such special points of excellence, they must always be held to occupy an important place among dry processes. The great fault attributed to collodio-albumen plates is their slowness, an exposure of twenty minutes being sometimes required under circumstances of lighting which, in the case of the modern rapid processes, would not necessitate an exposure of twice as many seconds.

Previous to describing in what manner this stigma of slowness may in a great degree be removed from collodio-albumen plates, it is fitting that we give a brief outline of the various methods by which such plates have been prepared by those who have most successfully worked this process; and, to prevent misunderstanding, we shall include under the generic designation of collodio-albumen all those processes in which albumen is called to enact the part of a preservative or organifier.

The original process, introduced by Dr. Taupenôt, differs from all others in being to a large extent an albumen process upon a collodion substratum; that is to say, the albumen was iodised and sensitised *per se*, its function not being confined to the *rôle* of a mere protective varnish to the stratum of collodion underneath. The plates are prepared by coating them with a bromo-iodised collodion giving a short or "rotten" film; they are then excited in a negative silver bath of the kind commonly made use of by wet collodion workers, and after remaining in this bath for the usual time the plates are taken out and washed, then transferred to a weak bath of iodide of potassium and thoroughly washed. This, be it understood, is merely a preparatory coating of the plate to act as a substratum for the iodised albumen, which is applied before the collodion is allowed to dry. The iodised albumen is prepared according to the following formula, which was published in our Almanac for 1866, and which is believed to give the best proportions that can be adopted:—

The white of	1 egg.
Distilled water	½ ounce.
Iodide of ammonium	4½ grains.
Bromide of ammonium	2 ,,
Ammonia	10 drops.

Before adding the water to the albumen dissolve in it the salts and sufficient iodine to make it of a pale sherry colour, then add the ammonia. Beat up the whole to a froth, allow to stand for a few hours, and pour off the clear portion, which is ready for use. Apply this to the plate by pouring it on and off at different corners, and rear up the plate to dry for half an-hour, after which subject it to the action of heat before a hot fire. All this may be done in not over strong daylight. The plates may now be stored away, for months if required, until it is convenient to excite them, which is done by immersion for three minutes in a forty-grain silver bath, to which has been added half-a-drachm of glacial acetic acid for each ounce of the solution. Next wash thoroughly, and if the plates are to be kept for any length of time apply sufficient of a saturated solution of gallic acid to flow over the surface, after which allow them to dry.

The process of preparing plates here given is an improvement upon that of Dr. Taupenôt, from which, however, it differs only in matters of detail, being similar to his in its leading features.

The Fothergill process has produced negatives of equal excellence as the foregoing, and possesses the merit of being somewhat less complex in the manipulations required. A plate is coated with an old and porous collodion, and sensitised in a thirty-five-grain bath. It is then removed to a flat vessel containing distilled water, and is allowed to remain there *not* so long as to be thoroughly washed, but only for about a minute, the water being agitated by rocking the vessel. It is then removed, and receives an application of a preservative composed of the white of one egg mixed with two ounces of distilled water and ten drops of ammonia. This is allowed to remain on the surface for about two minutes, during which time an action is taking place between the residuum of nitrate of silver left in the film from the slight washing it received and the albumen. It is now *thoroughly* washed, and dried without heat. If the plates are to be kept for a long time a final application of a solution of gallic acid, as in the former process, is desirable.

It was found by Dr. Ryley that the coagulation of the albumenous organifier of a collodion film might be otherwise advantageously effected than by means of nitrate of silver, and his experiments culminated in a process which, either for the beauty of its principle or the excellence of its results, has never been surpassed. When a collodionised plate has been sensitised as usual, and then thoroughly washed, a small quantity of diluted albumen, similar to that made use of in the Fothergill process already described, is poured on and off the plate, taking care that every part is covered. The best results we have obtained were with the white of one egg to three ounces of water and ten minims of ammonia. After allowing a little time—say two minutes—for the albumen to permeate the film, the plate is suddenly immersed in a vessel of boiling, or, at anyrate, very hot, water, which must be conveniently at hand. A tin tray placed over a Bunsen gas stove is very handy for this purpose, although when we prepare a few plates by this process, as we frequently do, we keep a kettle of boiling water close at hand, and, holding the plate in the left hand and the kettle in the right, we pour into the tray sufficient water to well cover the plate, which is then immediately immersed. In half-a-minute it is removed and reared up to dry, which it does with a hard and glassy film not easily injured.

A process by which Mr. W. England has produced many charming pictures—presumably those for which he obtained the medal in connection with the last exhibition—consists in collodionising and sensitising as before, then partially washing, and applying albumen with a final washing, as in the Fothergill process, to which he adds another application, namely, that of a little of a thirty-grain solution of nitrate of silver, each ounce of which is acidulated with a few drops of glacial acetic acid. A thorough washing completes the preparation of the plate.

The processes here described comprise the best and most reliable of those in which albumen takes part; but, as we have said, they are all more or less slow, mainly owing to the mode of development employed, which is that of acid pyro. In proportion as the alkaline system of development is applied to these processes so is the rapidity increased.

REMARKS ON DR. MONCKHOVEN'S PAPER.

[A communication to the Photographic Society of Great Britain.]

In commenting on the paper contributed to our last meeting by Dr. Monckhoven one may for the present dismiss the question of the suppression of bichromates in carbon printing, and proceed to his suggestions for a more perfect fixation of the pigment image, and the introduction of ferric oxide as a brilliant pigment absolutely inalterable by the solar rays.

Before doing so I wish to express a certain diffidence that I experience, due to the fact that, being commercially interested in all that pertains to carbon printing, I stand before a Society like this, not only with the fear of being credited with "talking shop," but with the dread that the bias of a trade interest may really obscure the judgment and indispose me for the judicial investigation of a new fact. I shall endeavour to avoid any such bias as far as possible, and I feel my position somewhat easier in the present case, as the author of the paper which is to be considered is not only a distinguished *savant*, but has thrown his resources and energy into the manufacture of carbon tissue as a trade. You, therefore, gentlemen, outside the disturbing influences of any commercial rivalry, may maintain evenly-balanced minds, and can discount, to any extent found desirable, the statements put before you. In the paper to be considered it is evident that Dr. Monckhoven comes before the Photographic Society of Great Britain not as a manufacturer but as a *savant;* that, as such, he prefers the honourable reputation of the discoverer to the profits of the patentee, and therefore places the results of his chemical researches freely before the public. This Society cannot but feel honoured to be the recipient of original papers offered in such a spirit.

This premised, I feel bound to object to the first part of the title of the paper, *On the Fading of Carbon Prints*, as unwarranted by facts, and consequently misleading, The experiments detailed and the arguments adduced by Dr. Monckhoven are intended to prove that in the ordinary production of a pigment print the bichromate of potash is not fully deoxidised, that the print leaves the alum bath with a tinge of yellow, which, upon after-exposure for a considerable time to the direct solar rays, changes to a greenish hue; with this change of colour the chromic salt present in the pigmented film has reached the stage of sesquioxide of chromium, when any further change is not to be apprehended.

Ignoring experience, and for the sake of argument granting all this to be true, this is not fading of the picture; at the worst it is only an alteration of tint—one that does not disturb the relation of light and shade, or impair those subtle half-tones on which its photographic excellence depends. To say that carbon prints fade in the sense with which we apply that term to their silver prototypes is to belie common experience and the whole history of the process. Such an assertion is sufficiently contradicted by the myriads of prints spread over Europe the last ten years by the indefatigable enterprise of the late Adolphe Braun. Judged by the practical experience of fourteen years, one may fairly say that carbon printing has removed the one reproach of the photographic art—the fugitive nature of its beauty. From my own experience in dealing with large numbers of pigment pictures, and from my position as a natural recipient for complaints of fading, if such existed, I can honestly declare (postulating the avoidance of known fugitive colours in the tissue, and proper care in the production of the prints) my belief to be that, for all the purposes of use and ornament to which they can be applied, carbon pictures are absolutely permanent.

If for the ends of use or beauty it were essential to expose photographic pictures for months to the direct rays of the sun, my conviction might possibly have to be modified to the extent indicated by Dr. Monckhoven, namely, that a yellow tint not discernible by ordinary vision when the print is produced changes to an almost equally invisible green after long exposure to sunlight.

I have made an extensive search through a great variety of prints in various colours to discover any traces of that congenital yellow predicted by Dr. Monckhoven. I place a series of such pictures before the Society this evening. As you may observe in many cases the half-tones denote an incredibly thin film of the pigmented gelatine, and in others the high lights are denoted principally by the white surface of the paper support, where, if visible at all, the yellowness of the chromic salt should be descernible. Upon the walls you will see examples of duplicate and similar prints in frames that have been subjected to abundant daylight in a lofty gallery with glass roof for from three to eight years. These prints are the productions of Braun and of the Autotype Company. The loose prints are from stock kept in portfolios or drawers, and can be compared with those in frames after years of daylight.

I do not produce these specimens and make these statements as arguments against the theory advanced by Dr. Monckhoven of the changes produced by light on the chromic salt; but rather to show that the *Fading of Carbon Prints* is not a judicious title for the paper, and is calculated to convey an erroneous impression as to their real and relative permanency. The so-called "fading," if it exist at all, is only a minute change of *nuance* in these pictures, and that change can only be expected under conditions of exposure to light which, in the same conduct of human affairs, do not usually occur.

With regard to this theory of imperfect oxidisation of the chromic salt in the ordinary process of carbon printing, the experiments detailed are interesting, and may probably suggest a method of perfect fixation. While contending that experience proves that carbon prints, after ten years' exposure to the ordinary influences of light and atmosphere, are as perfect as on the day of their production, I will cheerfully admit that any new light thrown upon the chemical changes involved, and affording the means to ensure more perfect stability, is a boon to be thankfully acknowledged. Although roasting our photographs in the sun is not a human need at present, yet the knowledge that they will pass triumphantly through such an ordeal renders our interest in them more secure.

The experiment of immersing a sheet of plain paper in the bichromate bath, exposing to light, washing in boiling water, and fixing with alum is not by itself conclusive. The bichromate penetrates the fibrous nature of the paper more intimately than it does the pigmented film of gelatine; the paper does not supply the same organifier and is less accessible to the impact of the light. The experiment is not parallel with the production of a pigmented print, and might be dismissed had not Dr. Monckhoven, since the presentation of the paper to the Society, published an experiment more to the purpose. He prepares a gelatine film with sulphate of baryta, exposes to light, developes on a glass plate, and finds the resultant colour to be yellowish and convertible into green by continued insolation. This is an experiment largely supporting the Doctor's theory of the chemical changes involved, and of the value of his suggestion to add to the alum bath a proportion of bisulphite of lime. If no drawbacks shall be found to the employment of the lime the comfort of a theoretical security will be added to the practical immunity from change enjoyed.

For all practical purposes, it may be said, the fading of carbon prints is simply a question of the pigments employed. Lampblack, Indian ink, red chalk, and the various earthy colouring matters employed on the bases of carbon pictures, can be relied on with absolute confidence; but as more brilliant effects are demanded, and as it is sought to emulate the beautiful tones obtained in silver printing, it becomes quite possible to fall under suspicion. The seductive beauty of the cochineal lakes has been dallied with by most tissue makers. Carmine has not only added bloom to the cheek of Phyllis, but has imparted lustre to a good many gelatine pictures. In pigment printing, however, this delicate colour was used very sparingly, until M. Lambert, of chromotype renown, demonstrated the latent capabilities of carbon to rival, and perhaps to surpass, the finest picture obtainable by the older method. This gentleman possessed an admirable tact of manipulation, and had so deftly combined all previous experience as to produce from portrait negatives more beautiful pigment pictures than had been known before his time. His results were almost unique, the labours gave a decided impetus to carbon printing, and although the preference for a roseate hue (at that time only obtainable by cochineal) led to a temporary vitiation of the standard of permanency, yet this was counterbalanced by the incentive it gave, in various directions, to provide substitutes for the cochineal lakes, and to the production of permanent tissues of finer structure and more variety and brilliance of tone. I have placed on the wall a frame of twelve cabinets, the work of Mr. Ferranti, of Liverpool, produced while M. Lambert was in England, and with the tissue he recommended. These pictures were printed nearly three years ago, and after exhibition at Edinburgh have hung in the Autotype Gallery. If compared with a card of nine *cartes de visite* adjoining, recently produced with the same tissue, the members will be able to discern the minute loss of bloom from two years' exposure. It will be observed that the delicate half-tones of the picture are perfectly preserved, and fifty years hence, although the tone will be still cooler, there is no reason to fear but that they will remain charming photographs, creditable to the artist, and evidencing a high degree of mechanical perfection in the tissue employed.

In the paper before us we find a statement that the vitiating action of light upon colour is interfered with by the presence of the chromate salts, and that while alizarine pigment by itself will slowly change under the influence of the sun's rays, if the alizarine be in combination with gelatine in the form of a carbon print, the change will be greatly accelerated. This is singularly opposite to the fact with regard to carmine, which, employed in carbon tissue, manifests a power of resistance to light immensely superior to that possessed when uncombined. If any one spread cochineal lake in a thin layer on paper, he will not wait long before perceiving a change under the influence of light. Despite the theory that the ordinary washing and fixing of a pigment print leaves an imperfectly deoxidised chromic salt to facilitate decomposition of the colour, it does not apply in the case of so delicate a pigment as carmine. Probably the antiseptic property of carbon in contact with a pigment of animal origin has something to do with it. Anyhow, it indicates that further experiment is desirable to avoid the danger of adopting hasty conclusions.

It has been long felt by the company with which I am connected to be exceedingly desirable to abandon the employment of cochineal lakes, and my friend, Mr. Sawyer, has given much attention to substitute the products of alizarine. The alizarine colours appear to me to afford not only great beauty and variety of tone in combination with carbon, but to be free from objection on the score of want of permanency. They afford, as is well known, some of the most durable dyes known to commerce, and as far as careful tests, and a not inconsiderable experience goes, they can be enlisted in the service of the pigment printer with perfect safety. There is no difficulty in utilising aluminate of alizarine in a manner to give the tone required, without either rendering the tissue insoluble or staining single transfer paper; but it requires very careful management and combination so to prepare it as to avoid staining the picture when developed on a collodion film. Since the hitherto high reputation for permanency possessed by the alizarine colours is called in question by the experiments of Dr. Monckhoven, it has been deemed expedient to recommence testing in a critical manner the pigmented prints in which such colours are employed. As these tests have been continued for barely three weeks, and not the slightest change is discernible at present between the masked portion and that exposed to the sun, it would be futile to bring them before you this evening. Three months hence the evidence will be worth recording, and I can promise that the Autotype Company will place the results before the Society. It is, of course, perfectly easy for any member to test the matter himself.

Dr. Monckhoven has produced a very rich brown tissue with a peroxide of iron pigment, but although he was careful to give your Society his method of preparing alizarine aluminate, the indications he afforded for the preparation of his new peroxide of iron are too indefinite to be of practical use. There is no novelty whatever in the production of aluminate of alizarine; but the modification of an oxide of iron in such a manner as to convert it from a dull and opaque to a lustrous and transparent pigment is an achievement worth being recorded in detail. Whatever may be the mode of its preparation it yields a fine colour; but it appears to be limited entirely to the brown shades, whilst the alizarine products readily lend themselves to combinations with permanent blue for attaining the purple tones.

In conclusion: I may be permitted the expression of my belief that, but for the existence of Swan's patent, neither in England nor on the continent would carbon printing have reached its present stage of importance. Without the probability of ultimate reward held out by patent, the capital and energy necessary to overcome the many practical difficulties would not have been overcome; but now that commercial success is shown to be possible, the lapse of the patent stimulates research, attracts fresh talent, and, by the exertions of new workers, will render the transition from a fugitive to a permanent process of printing more rapid and easy. The field is large, and by no means wholly won. Although for artistic purposes pigment printing offers a wide range of monochromic effect and a special expression not competent to silver, and although for enlargements it affords features of decisive superiority, yet for the facile and certain production of small work of high excellence there is still much to be desired. From my personal knowledge of the energy, ability, and scientific attainments of Dr. Monckhoven, I anticipate that his concurrence will be of great advantage to the cause of permanent photography.

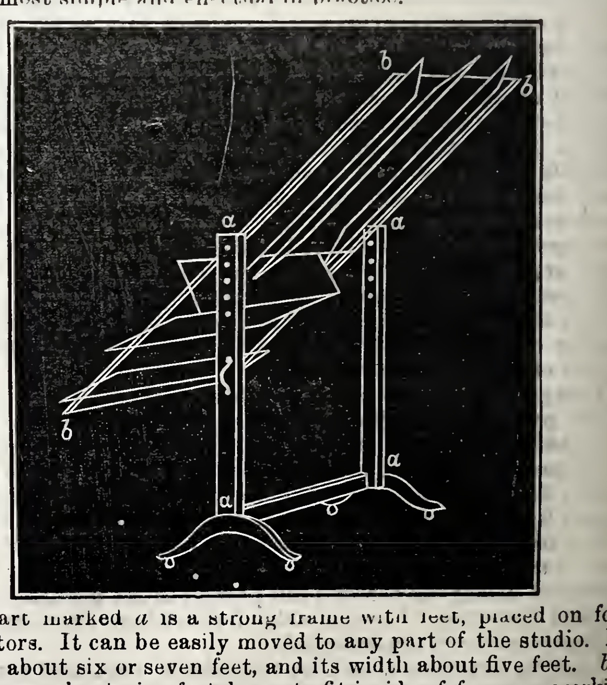
It will be very interesting to receive the further details promised of his experiments for the suppression of bichromates in carbon printing, but in the present stage of the subject it would be difficult to discuss them with advantage. W. S. Bird.

AN IMPROVED MOVABLE SCREEN.

As the use of movable screens to control the light is of great importance to photographers, I will endeavour to describe one that will be found most useful both by professionals and amateurs.

To give a description of every form of head-screen, side-screen, reflector, &c., that I have seen or used would be of no service, as they number many dozens, all of more or less service, but most of them with many disadvantages.

The head-screen (as it is named) which has been so often described, is one of the best forms; but occasionally it will be found necessary to use two or three, which makes it rather complicated. After carefully studying the different advantages and disadvantages of the screens in present use, and bestowing a little thought on what is required, I am convinced that the screen described here will be found most simple and effectual in practice.



The part marked a is a strong frame with feet, placed on four good castors. It can be easily moved to any part of the studio. Its height is about six or seven feet, and its width about five feet. b is a light frame about nine feet long, to fit inside of frame a, working on a bolt and thumb-screw, and, as will be seen, it can readily be adjusted at any desired angle. Inside frame b are a number of smaller very light frames, width from sixteen to twenty-four inches. These work on a pin or bolt in the centre of each end, and are fitted either vertically or horizontally. On the smaller frames is stretched any material, either opaque or transparent, according to effect designed. Tissue-paper might be used, but it would be easily injured. A very simple way to make tracing cloth or calico more transparent is to thoroughly wax it all over. It gives a beautiful, soft effect.

In describing this frame I do not give any definite proportions as being best, but simply give the principle; and as it is not patented it can be modified to suit any studio or purpose by the judicious use of a little *brains*. By the use of two, covered with an opaque material, it would be an easy matter to light a sitter out in the "open," as the sun could be kept off at any part of the day.

The most important points are not to have frame *a* too low; to have frame *b* long enough to come well over the sitter; and not to have the inner frame too wide, about twenty inches being the best width.

To give a full description of the many uses to which it can be applied would take up too much space; but on any point that may not seem quite clear it will be a pleasure to me to give a more definite description. J. Cowell.

LANDSCAPE WORK AND ITS RELATION TO ART.

[A communication to the Edinburgh Photographic Society.]

In noting down a few thoughts in connection with landscape photography I do so with the hope of encouraging my brother workers in the same field to aim at the highest possible excellence, and to always go *forward* with the work so that, ultimately, we shall compel even the most obstinate enemies of Photography to admit that she *has* art claims, and will *assert* them; that, no matter *what* the means, the result must be looked at as the production of the *mind*. What we want is not *technical* but *art* education, and this, I maintain, we must use all our energies to develope. We have, alas! too few eminent artists either in portraiture or landscape; but I am sure you will agree with me in saying that the works of all these men will be found to be stamped with an individuality which it will be found impossible to deny, showing clearly that the brain has been at work in a predominant degree, and that lenses, cameras, and other materials have only been what brushes and colours are to the painter. I do not mean to convey that we should not take care to provide ourselves with good materials—the best we can get by all means. Will you not find the painter equally careful that his brushes are of the required quality, also that his colours possess the necessary purity? But all these are eminently subservient to the brain, which conceives the work, and are only as a means to carry it out. It does not matter to an artist what collodion or other matter he uses, so that it be good; it will not influence the result. It may give him a little more trouble in some cases, but the effect will be the same; he has made up his mind to produce a certain result, and he will *do* it.

Suppose, for the sake of illustration, that two or three photographers are requested to make a negative, the subject being a cottage, immediately at the back of which is a hill. They are to treat the subject *pictorially*, and are left to themselves as to the means they shall employ. We will take it for granted that, technically speaking, they are all equal.

Photographer No. 1 will probably go to the place, and it being a fine clear day and wind steady—the sun, we may add, is shining almost vertically on the scene—he will immediately conclude that nothing could be more favourable; he "will show every stone in the cottage, and, for that matter, every stone on the hill, too, if there be any." The camera is arranged, best lens fitted and carefully stopped down to give extreme sharpness, the plate is exposed and developed, and "Oh! joy! the negative is a beauty—sharp as a needle; let them beat that if they can!"

Photographer No. 2 will go about his work after another fashion; *he* will turn out something different to that other fellow. He has been told that it is best to have the light strike the subject at an angle of about forty-five degrees, and he selects the time of day accordingly. It is true the image on the ground glass does not strike him as being particularly beautiful; but has he not gone strictly according to his instructions? *He* will not have the cottage in the centre of the plate as No. 1 has shown it; but, still following his instructions, he puts the principal object to the right or left. He must now have a foreground to complete matters, and what could be better than Mr. and Mrs. Rustic, the occupiers of the building, who are straightway induced to "stand as if they are talking to each other?" He has been told that figures *judiciously* introduced are a great help, and "what could be more natural than this arrangement?" The figures look toward each other as if they were striving to stare each other out of countenance; however, the instructions have been strictly adhered to, and so all *must* be right. The negative is taken, and although the result, in comparison with No. 1, is very different, still, judged pictorially, they are about equal.

Photographer No. 3, whom we will suppose to be an artist of cultivated taste and feeling, goes to look at the cottage; but gentlemen Nos. 1 and 2 chuckle as they see him going, for how can he possibly improve upon their productions? Arrived at the spot the artist is disappointed—the ugliest portion of the cottage is in strong sunlight; and he feels that he is helpless to produce a picture under that condition. He considers the subject, and calculates that in the very early morning the opposite, and very picturesque, gable will receive the light, and he determines to be up betimes to see the effect, and seize it if it be satisfactory. The next morning is fine, but hazy; however, he does not mind the haze. Perhaps he says to himself as he is dressing—"The effect will be prettier, as it will throw the cottage into bolder relief, and assist photography in separating it from the adjoining hill." Arrived at the scene, he is charmed beyond measure at his little cottage in its new garb. The sun, as he predicted, though shining faintly, is tipping the gable he so much admired. The housewife, just up, is evidently starting the fire, as the smoke is lazily pouring from the chimney; the hill behind is slightly obscured by the haze, but looms up grandly, and the picture is complete. And now, to make the most of it, no time is to be lost, as the effect may soon be gone. Care is taken to have the smoke from the chimney relieved by the dark fir which is near to it, and the camera is moved up as near as possible to the creepers which hang over the wall in front; no other foreground is required. He asks permission to have the rustic door partly open, as he is greatly in want of a little intense shadow. And now a last look at the ground glass. He breaks away a twig that will *not* come into focus, but pokes itself provokingly in front of that cluster of roses. "Ah! what is that?" A gleam of light of greater intensity now steals across the screen—not altering the effect, but heightening it, the sun seeming to say, "Well done, old fellow! I'll help you; but come on now quickly with your plate or I may not be able to keep it up." The negative is taken and developed, and I tell you that man carried home a picture; he carried home a result produced by true art feeling and careful study. He saw a beautiful effect, and his artistic mind grasped it at once, and determined him to secure it. Had the early morning effect not pleased him he would have secured it under some other aspect; but you may rest assured he would have made a *picture* of it—nothing else would satisfy him. He had become accustomed to work up to a certain standard and he could not go below it.

I am sorry the limited time at my disposal will not allow me to enter more fully into this subject; but I shall be amply repaid for the little trouble I have taken in writing this short paper should it be the means of increasing the love, which I am sure all of you have, for our beautiful art.

I have sent for your inspection a few of my studies of English and Irish scenery, which may be of interest to you. I have also forwarded a few smaller views which require some explanation. I have been commissioned to illustrate several of the poets with photographs from nature, and my people are at present busily engaged in printing four or five thousand of these little views. Nos. 1 to 18 are specimens of these studies. I send you them because I know the interest we all have in looking at actual productions; and I know no better means of advancing our art and mutually improving ourselves than the system of exhibiting the results of our labours, so that we may see where we are at fault and where improvement is needed. We can all learn something, and should not be ashamed to do so even from the humblest of our brethren.

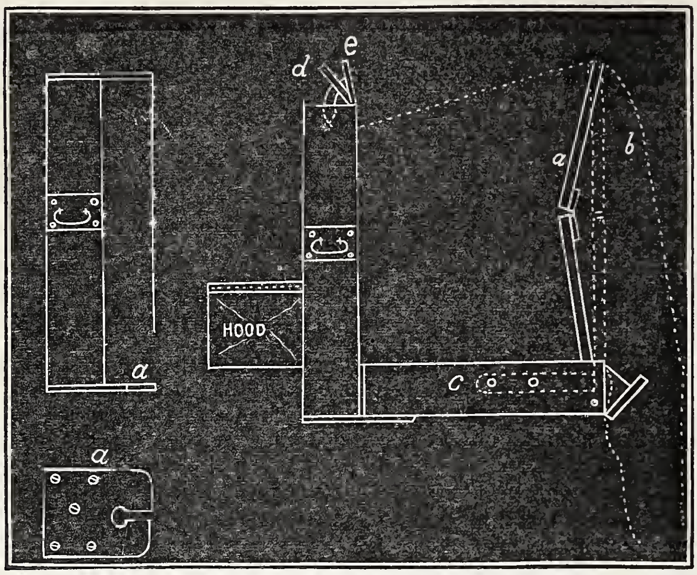
Payne Jennings.

A PORTABLE TENT AND CAMERA COMBINED,

As Exhibited and Described at the Meeting of the Edinburgh Photographic Society, 3rd April, 1878.

This is a simple means of preparing, exposing, and developing a wet collodion plate in the field. As a dark tent it can be rapidly constructed and removed *without a single detached screw, bolt, or spar*. The woodwork, of half-inch yellow pine, is divided into two portions—the back 24 × 20 × 4 inches; the front 24 × 24 × 4 inches. It is fixed in the usual way to the tripod by means of a bolt, which in this case need never be unscrewed from the triangle. A cloven foot at the bottom of the front portion, *a*, *fig.* 1, is slipped under the bolt head and screwed tight. The back portion, being hinged four inches from the bottom of the front portion, folds down and rests firmly and securely on the cloven foot (see *fig.* 2). There is now a cover of two plies of black twilled linen tacked round the inside of the front portion and along the bottom, and is raised by a wooden frame or stretcher (*a*, *fig.* 2) which folds up, and is held in position

FIG. 1. FIG. 2.

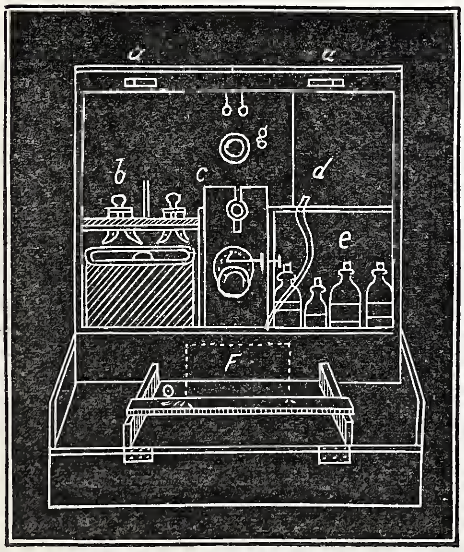


CLOSED. OPEN.

by the tension of the cloth cover *b* and by two springs *c*, which are self-acting when the stretcher is raised to the proper height (see dotted lines). It is illuminated from a window at the top covered with yellow calico. The light passing, as it were, down the inside wall of the tent, which is covered with yellow paper, is reflected inwards and can be moderated according to the intensity of the light outside by means of a shutter, which may be raised and lowered at pleasure from the inside by means of a wire, *d*. Another shutter, *e*, of similar construction, is for the admission of white light and water when wanted. A ventilator, *a*, *fig.* 3, under each shutter keeps the air pure and pleasant.

To use this tent as a camera: having fixed upon the point of view a shutter 8 × 6 inches is raised, and a hood of black cloth folds out and uncovers and shades the lens, as in *fig.* 2. *b*, *fig.* 3, is a water-tight bath. The india-rubber top is held in close contact, by an elastic band, with the two pinching screws, which are permanently fixed in their places, so that, when unscrewed, the bath falls forward and lies at a proper angle for use. When done it is raised to the perpendicular, and with a few turns of the screw it is water-tight. *C* is a swing front, with raising and lowering motion and lens. The swing is effected by means of a frame of wood about 8 × 4 inches, balanced on either side by screws—one for pinching it at the required angle. The raising and lowering motion is on much the same principle as the usual camera fronts. The lens is screwed to the sliding front inside or outside, although I prefer it to be so arranged that the stops may be introduced from the inside of the tent. To do so the lens must be reversed in its jacket. *d* is a water tank; *e* a recess for chemicals; *f* a bridge across the developing tray, with ground glass in position for focussing—an arrangement whereby dark slides, plate carriers, &c., are abandoned. The bridge, moving backwards, forwards, and horizontally, suits any size of plate. An American spring clip fastened to the top of the bridge holds the plate by the left hand bottom corner quite steadily and perpendicularly. *g* is a small pane of ruby glass, not necessary for light, but as an outlook through which, when about to expose, you may watch the happy moment when the foliage is at rest, &c.

FIG. 3.



INTERIOR.

The whole arrangement has given me great satisfaction, and I have much pleasure in recommending it to my brother photographers.

JOHN MCKEAN.

ON THE USE OF ALCOHOL IN GELATINO-BROMIDE EMULSIONS.

[A communication to the South London Photographic Society.]

AT our last meeting I was asked by Mr. J. T. Taylor to elaborate the article *On the Use of Alcohol in the Gelatino-Bromide Process* that I had the honour of contributing to THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for the present year. This I have endeavoured to do. I wish it, however, to be clearly understood that I am not putting myself forward as so old and experienced a worker in the process as many of our members, such as Messrs. Kennett, Taylor, Nesbitt, Wratten, and others; but, having had much experience during the last few years in the use of gelatine for another branch of photography, I may perhaps be able to say sufficient to open a discussion on the subject.

Now it is impossible to work much with gelatine without being struck with the great difference in the various samples to be found in commerce, no two kinds being alike, and rarely indeed are any two samples even by the same maker identical. Some will require as much as fifty per cent. more chrome alum to bring about insolubility, while others, again, will become absolutely insoluble upon being treated with bichromate of potash or ammonia. So variable, indeed, are the reactions of this material with the salts of chromium, that it is now the practice at the Autotype Company's works to submit each fresh supply to a chemical examination before taking it into use, so that it may be modified to suit the different purposes to which it may be applied.

Happily the gelatino-bromide emulsion worker is exempt from these perplexing reactions, as all he requires is that the gelatine should be of good quality *as* gelatine, and free from any impurity likely to act on the silver bromide. These conditions may be relied upon in Messrs. Nelson, Dale and Co.'s photographic gelatines, and also in their opaque gelatine, one or other of which, I believe, is generally employed in this process. We all know that gelatine in a dry state will keep for any length of time free from decomposition, as witness the glue joints of old furniture, violins, &c., many of which are as sound now as they were when first made a century or more ago. And we must all admit the judgment and ingenuity of Mr. Kennett when he introduced his pellicle in the dried form, the keeping quality of which is now beyond question.

Although gelatine will keep indefinitely in its dried state, it is quite the reverse when in a jellied form—in fact, I scarcely know a substance so liable to decomposition as this. The more aqueous to solution the more liable is it to decomposition. The manufacturers even tell us that, if a thunderstorm occur during the time a batch is in a heated or fluid condition, it generally sets up decomposition or putrefaction, which renders it useless as a first-class gelatine. This has been borne out in my own practice; for, during the autumn of last year, when I was daily preparing between two and three hundredweight of jelly for tissue making, I was surprised on one occasion to find that a batch had become decomposed, showing beads of gas studded throughout its bulk, although some prepared in precisely the same manner some days before and some after were quite perfect, all being from the same batch of gelatine, the only difference being that during the time it was in a fluid state a rather severe thunderstorm passed over the neighbourhood. When this decomposition is set up in it the only course to adopt is to throw it away; for, if it be used for any purpose in photography, it is sure to bring trouble to the operator.

Although Mr. Kennett's pellicle is very convenient, still an emulsion that will keep for a reasonable time in the jellied form, so as only to require warming when a few plates are required, is a desideratum; and to secure this end various antiseptics have been suggested, such as carbolic acid, salicylic acid, and also various essential oils, such as oil of cloves, &c. Carbolic acid will, undoubtedly, prevent putrefaction if added in sufficient quantity; and I am not aware that *pure* carbolic acid will exercise any deleterious effect on the silver bromide. Salicylic acid I have not tried, but its price is, I think, a great bar to its use. I believe that few will care to use essential oils, owing to the reducing action most of them have on the salts of silver. The antiseptic I am about to advocate is alcohol (methylated will do), which prevents decomposition of gelatine—I had almost said indefinitely, but I have not tested it to *that* extent.

Here, however, is a bottle of solution containing about one-fourth its bulk of alcohol which has been made over eight years, and you will see that it is quite as good now as when first prepared.

Not only does the alcohol act as an antiseptic and has no action on the silver bromide, but it assists in other ways, causing the emulsion to flow more freely over the plate like collodion, and to set quicker, and also to dry in much less time than when water alone is the solvent. The quantity that may be added depends very much on the kind of gelatine used. *This* flask contains one part of gelatine to three of water and three of spirit; you will notice by its opalescent appearance that part of the gelatine is precipitated. *This* flask has one part of gelatine to four of water and two of spirit, and is only slightly precipitated. If either of these samples be liquefied the solution will be transparent, and a plate coated with it will become opalescent as soon as the gelatine has set; but it will be quite transparent when dry. Here is a plate coated from the flask containing the larger proportion of alcohol, which shows that a large proportion of spirit may be added without injury.

I may here remind the members that the more frequently a solution of gelatine is heated and the longer it is kept in a fluid state the sooner it loses its property of gelatinising or setting, so that I advise that the stock of emulsion should be kept in several small bottles in preference to one larger one, so as to avoid having to melt the whole bulk each time that a few plates are required. And for this reason I should avoid the elimination of the haloid salts by dialysis whilst the emulsion is in a fluid state; but I think that few will require this advice after seeing Mr. Wratten's very simple method of effecting this, as shown by him at our last meeting.

There is another use to which alcohol may be put in this process, namely, in abstracting the water from the plate so as to allow of its being dried by heat; for, if after the gelatine has set, the plate be immersed in alcohol for a minute or two, it may be placed on a hot-water bath without fear of its running off the plate, seeing that gelatine is insoluble in strong alcohol. By this means I have coated a plate, dried it, printed a transparency, developed, fixed, and again dried it, in little over a quarter of an hour.

For coating the plate I always use a Crookes' albumen pourer, which I cannot too strongly recommend for the purpose, as not only is the emulsion filtered immediately before pouring on the plate, but the air-bubbles—always so troublesome in gelatinous solutions—are prevented from getting on to the plate. Of course the instrument must be placed in a vessel of warm water when in use.

At the last meeting one of our members raised the question of the inequality of the film if the plate were not perfectly flat. This was disposed of by Mr. Kennett, as far as fairly flat plates are concerned; but not in the case of curved ones, such as those used in the late Mr. Sutton's panoramic camera. Such plates, I find, may easily be coated with gelatine emulsion by adopting the plan employed in coating albumen plates, namely, to first coat the plate with a porous collodion, and, after washing out the ether and alcohol, to pour on the emulsion, and allow it to soak well into the film. It is not then necessary to place it horizontally to set, but it may be reared on end to dry. This will be found very advantageous in exceedingly hot weather. Of course the plate should be rinsed with warm water to slightly heat it before applying the emulsion.

E. W. Foxlee.

THE VOLUMETRIC ESTIMATION OF THE STRENGTH OF SOLUTIONS OF SILVER NITRATE, AND THE RECOVERY OF SILVER FROM WASTES.

[A communication to the West Riding of Yorkshire Photographic Society.]

Before entering into the details of my subject it will perhaps be best to commence by a few remarks illustrative of the principles on which the various reactions are founded, which will help us not only to a better understanding of the subject in hand, but of many other chemical changes in connection with photography.

Up to the present time the chemist is acquainted with sixty-two elements. Many of these, in some form or other, are in daily use by the photographer. It would be difficult to find another business where more of the elements are brought into use and in proportion as our knowledge of these substances increases so will the science be advanced.

It is found that each element has a definite combining proportion by weight and volume, and possesses in and out of combination with other elements such proportionate weight and no other quantity. Hence, if the combining weights of the elements in a compound be summed up such sum will be the comparing weight of the compound.

For the better understanding of our subject I will put on the black board the relative combining weights (hydrogen taken as unity) of the various elements we have to do with tonight:—

	Combining wts.	Symbol.
Silver	108	Ag.
Nitrogen	14	N.
Oxygen	16	O.
Chlorine	35·5	Cl.
Sodium	23	Na.

Silver nitrate is a combination of silver, oxygen, and nitrogen, and is the result of the action of nitric acid ($H\ NO_3$) combined with silver, and may be put down in chemical formula thus:—

$$\begin{array}{ccccccc} \text{Silver.} & & \text{Nitrogen.} & & \text{Oxygen.} & & \text{Silver Nitrate.} \\ Ag. & & N. & & O_3. & & \\ 108 & + & 14 & + & 48 & = & 170. \end{array}$$

Chloride of sodium (common salt) is a combination of sodium and chlorine, and is represented thus:—

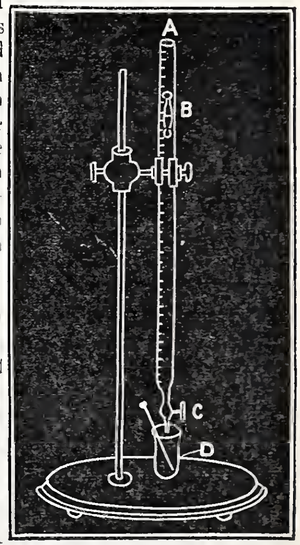
$$\overset{Na.}{23} + \overset{Cl.}{35{\cdot}5} = 58{\cdot}5.$$

This invariable combining proportion of the elements is one of the most beautiful subjects that the human intellect can study or contemplate; and it will be easy now to show how they can be used as an infallible measure one for the other.

If we take a solution of chloride of sodium and add it to a solution of nitrate of silver a mutual exchange takes place, whereby we obtain a precipitate of chloride of silver and a solution of nitrate of sodium. The exchange is thus rendered:—

$$\begin{array}{ccccccc} \text{Silver Nitrate.} & & \text{Salt.} & & \text{Silver Chloride.} & & \text{Sodium Nitrate.} \\ Ag\ No_3 & + & Na\ Cl & = & Ag\ Cl & + & Na\ NO_3 \\ 108 + 14 + 48 & & 23 + 35{\cdot}5 & & 108 + 35{\cdot}5 & & \\ 170 & + & 58\ 5 & = & 143{\cdot}5 & + & \frac{23 + 14 + 48}{85} \\ \hline & 228{\cdot}5 & & = & & 228{\cdot}5 & \end{array}$$

It will now be easily seen how the salt can be taken as a measure for the silver, or *vice versâ*. It only remains to apply the principles I have endeavoured to elucidate. I shall use for the purpose a Mohr's burette, A, graduated in grains and parts of a grain, into which I pour a portion of the solution of silver I wish to test, and by turning the tap C at the bottom I can regulate or measure the quantity of the solution run off with great nicety. The small tube B you see floating inside has a mark round it, and is known as an Erdman's float. With this float we can tell with great exactness the amount of solution run out.



I have here a solution of common salt in water. The solution is of such strength that one cubic centimetre of the solution will exactly precipitate one grain of nitrate of silver, and is prepared in accordance with the formulæ given above. We will take a quantity in this pipette—say five cubic centimetres—and put it into the beaker D, and place it under the burette. We will dilute the salt solution with a little distilled water and add a few drops of a saturated solution of chromate of potash, which will serve as an indicator.

The use of the chromium salt is, I hope, obvious; its affinity for silver being less than that of chlorine it forms a very accurate indicator of the exact point when the quantity of silver present is precipitated by the chloride of sodium—another formation of chromate of silver. This reaction is thus represented:—

$$\begin{array}{ccccccc} \text{Silver Nitrate} & + & \text{Potassium Chromate.} & \times & \text{Silver Chromate} & & \text{Potassium Chromate.} \\ 2\ Ag\ NO_3 & + & K_2\ Cr\ O_4 & = & Ag_2\ Cr\ O_4 & + & 2\ K\ NO_3. \end{array}$$

If we run in the silver solution slowly it is converted into chloride as long as there is any chloride of sodium in the beaker. As soon, however, as all the chlorine is combined the precipitate instantly ceases to be the well-known white, curdy one, and the liquid is turned a deep red, chromate of silver being formed. It requires some little practice to stop the flow of the solution into the beaker, but you will find that when you have just got the number of grains to run into the test the result is invariably the same. This process, the explanation of which may to some seem tedious, it will be seen can be performed in a few minutes, and it is I believe one of the best methods of estimating the strength of silver solutions. JOHN GARBUTT.

[We are compelled to defer till next week the portions of Mr. Garbutt's paper connected with the recovery of silver from wastes.—EDS.]

NOTES ON PASSING EVENTS.*

BY A PERIPATETIC PHOTOGRAPHER.

A FEW years ago, when I was making a three months' tour in Spain and the South of France, I became acquainted with a skilful stereotyper in a village where I was staying for a week, and observed very carefully his method of prosecuting his business. His process of casting stereotypes was by the French system, in which layers of paper and paste are hammered or pressed into contact with the type to be reproduced, a sharp mould being thus obtained from which a metallic counterpart is secured. Now, when reading a recent article in this Journal on obtaining casts for the Woodburytype process it occurred to me that stereotype casts ought to be very easily taken from a gelatine relief by means of the ordinary stereotype process of casting. Flatness, I am aware, is an essential requisite in a Woodburytype printing surface, and so is exquisite perfection of detail. The former can be ensured by attaching the pellicular relief to a flat plate of metal; the latter is always obtained in great perfection, as every one acquainted with practical stereotype casting is well aware. It may be this method has been suggested or even practised before now; but I have not seen it alluded to in the course of my reading.

I do not clearly apprehend why, as suggested by a recent writer in these pages, the education of photographers should be taken in hand by either the Photographic Society of Great Britain or by any other Society. Education is doubtless an excellent thing, but why a body of men meeting together to further their knowledge in the technics of a particular art should go out of their way to impart a knowledge of the three R's to any, merely because they are in some sense or other *attachés* to that art, it is not easy to perceive. The school board will see to it that embryotic photographers, while in their state of juvenility, shall not be allowed to rise to the state of manhood without receiving an elementary education, and what other kind of education does Mr. Hance advocate? A technical education is imparted by the master to whom the boy is apprenticed, and I am not aware of any other. It is well known that in point of education many of the photographic juniors can already vie with their seniors, some of whom are reputed to be scarcely able to write their own names. Education is already within the reach of every boy and girl connected with photography or any other branch of trade; and of those whose aspirations are so low as not to lead them to acquire education all I have to say is—let them revel in their social degradation, and remain hewers of wood and drawers of water in the photographic trade. It is not of such that either gentlemen or artists will be made.

The mere term "the fading of carbon prints," of which we have heard so much during the past month, seems to be a contradiction in terms. During the past week I was subjecting to a careful examination several portraits which were printed in carbon by Mr. J. W. Swan in 1864, and I affirm most positively that they are quite as good as the day—now nearly fourteen years ago—when I first saw them. Why, then, raise up a foolish clamour about "the fading of carbon prints?" No carbon print ever did, ever *can*, fade. *Pigments*, I grant, may, and often do, change their colour, but carbon never. Let the young photographer, whose mind is apt to get perplexed with "things that are not what they seem," allow himself to become well grounded in what I have just said as a sound basis for his faith in the permanence of the prints of the future. It may, after all, be well that so many photographs have faded when we consider the number of artistic atrocities that have been palmed off upon the public during the last twenty or thirty years.

In his paper on the *Elimination of the Nitrate Salts from Gelatine Emulsion*, read before the South London Photographic Society, Mr. F. Wratten somewhat over-estimates the difficulty of, or, more correctly, the time required, for effecting this end by means of dialysis. He objects to it on the ground that the material may decompose and become useless during the process of dialysing. This surmise is not borne out by the facts; for, whereas the operation of removing the soluble salts by dialysis need not occupy more than three or four hours, it has been shown by Mr. Bennett that the emulsified gelatine may, with advantage, be retained by means of heat in a fluid condition for several *days*. I have dialysed gelatine emulsion many a time, but I never had a batch spoilt from this cause; and, what is more, I have never yet heard of any who have had such an experience. Mr. Wratten is quite right in saying that it is "theoretically perfect," but wrong in asserting that it is "practically useless."

* Continued from page 160.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

ACCORDING to promise we now publish [see page 169] Mr. W. S. Bird's communication on Dr. Monckhoven's paper read at the March meeting of this Society. We also now give, from the official organ of the Society, the letter of Mr. J. W. Swan, and the remarks that were made on the subject.

Mr. SAWYER: Before proceeding on the discussion, it may be convenient if I state that, acting upon our request, Mr. Swan, of Newcastle-on-Tyne, has been kind enough to send a letter, expressing his opinions on the subject. I venture to interfere now, in order that Mr. Swan's letter may be before the meeting, as well as the communication just read. We considered it would be of advantage to the Society to have all the light that could be thrown upon the subject, and more especially from the introducer of the carbon process. Mr. Sawyer then read the following letter:—

DEAR MR. BIRD,—Remembering the wish which you lately expressed to me that I should contribute somewhat to the discussion on Dr. Monckhoven's paper tomorrow, I take the opportunity of saying that I have read the paper with great interest, and that in the main I am inclined to accept without dispute Dr. Monckhoven's statements with regard to the tendency of carbon prints containing cochineal, or even madder colour, to change colour under the influence of light; and I heartily agree with him that it is most desirable, if possible, to get rid of them altogether. The ephemeral character of the carmines of cochineal should be proclaimed as loudly and as widely as possible in the interest both of carbon printing and of painting, for it is lamentable to think that even first-rate artists still use it in their most valuable works. To ascertain exactly the effect of light upon it, I produced prints coloured only with this beautiful but frail pigment, and exposed these, half covered up, to brilliant sunlight. I expected to find evidence of fading in the parts exposed to light, but I was astonished to find it so quickly; even twelve hours' exposure was sufficient to produce a marked lightening of the colour in the more delicately-tinted portions of the picture. After this experience it is scarcely necessary to say I discarded the use of carmine, but I confess I found great difficulty in finding a perfect substitute for it, in so far as regards the brilliancy of colour. The best substitute that I could find at the time (I am referring to twelve years ago) was purpurine, one of the derivatives of madder. I found I could get very bright purples with this, and tested it in the same isolated way in which, as I have already described, I tested carmine. I found that it was incomparably more resistant to the action of sunlight than carmine; still it was not absolutely stable, and I felt that there was a want in this respect. Alizarine was just then beginning to be an article of commerce, and, as you know, I proposed its aid should be sought to overcome the difficulty. I see that Mr. Johnson and your firm, as well as Dr. Monckhoven, have all been working in this direction, and I believe a decided advance has been made by the employment of lakes, which are obtainable by means of alizarine, and a nearer approach has been made to permanence by their use as tinting pigments; for it must never be forgotten that that is the only function they perform, and that the basis—the solid ground, as it were—of carbon always holds good.

With regard to the iron pigments to which Dr. Monckhoven refers as efficient substitutes for vegetable reds, of course no one will dispute the advantage of discarding *totally* the use of the vegetable reds, *if* you can get all you want by means of oxide of iron. But is it possible? If Dr. Monckhoven has succeeded I congratulate him. I tried hard, but found, after I had done my best with it, a certain lack of brilliancy which the public would not put up with.

Dr. Monckhoven is right when he says that the iron red is only transparent whilst it is in a hydrated state; in that state, moreover, it is a foxy red with no purple shade in it. Dry and heat in order to bring out the purple tint as in Indian red, and immediately you have an opaque and heavy colour, not well suited for the photographic purple (which is the only case in which there is the least occasion to use a colour of a questionable kind); then it does not, or rather did not in my hands, quite fulfil all the requirements of the case. Dr. Monckhoven speaks of the variety of reds obtainable from iron. The tints vary from yellow ochre to Indian red, and all sorts of rich *browns* are producible by means of them; but photographic purple! Well, as I have said, I shall believe it when I see it. As to the chemical part of the paper, I will only remark that, according to my experience, it only needed a very thorough washing to eliminate completely all the chromium compounds acted on by light, and that the only tint remaining is a very faint green. This tint is producible, as I have proved, by light alone, without any washing of the composition, if the gelatine mixture is suitable, as it may be, for the production of this complete action. I have observed that under the action of light a film of gelatine containing, besides the bichromate, sugar of milk and glycerine, has the yellow colour completely discharged, and a chromium green is exchanged for it. The *rationale* of this change of colour is evidently in favour of the generally-accepted theory of the chemistry of carbon printing, which, I believe, I was the first to propound.—Believe me, dear Mr. Bird, very truly yours, JOSEPH W. SWAN.

Mr. SAMUEL FRY thought a little too much importance had been attributed to the conclusion arrived at by Dr. Monckhoven in regard to want of permanence. The conditions under which the specimens exhibited at the last meeting were prepared were such as could never be present under ordinary circumstances, in addition to which it was evident that the prints shown were imperfectly washed. At the same time he thought there were difficulties attendant upon the use of carbon prints in ordinary photographic work. For such purposes as enlargements, reproductions, work on porcelain, ivory, &c., nothing could be better; but when it was remembered that a photographic printer had to deal with a number of negatives, each requiring a different printing, it was evident that the carbon process as at present used could not be conveniently adopted, owing to the drawback that the picture could not be watched during the process of printing. When one looked at the works of the best known photographers it must be owned that carbon was still very little used in ordinary portrait and landscape work. Even Mr. Ferranti, whose carbon pictures were exhibited in the room that evening, used silver as well as carbon; and he (Mr. Fry), in determining some time ago what kind of printing he should adopt, after travelling hundreds of miles, and consulting a number of photographers, had come to the conclusion to issue his pictures in silver. At the same time he firmly believed that the general use of carbon, when the process was perfected, was but a question of time. Silver prints were very evanescent—far more so, he thought, now than they used to be; and although the public did not complain, they were certainly entitled to have their photographs as permanent as any other form of pictorial art.

Mr. Woodbury, in reply to the Chairman, stated that he had had very little to do with autotype printing. His prints were mostly kept in books, and certainly had no bichromate in them, being simply pigment and gelatine.

Mr. Bolas observed that with regard to the oxide of iron giving a purple tint, as stated by Dr. Monckhoven, he must confess that after a variety of experiments he had not been able to verify this.

The Chairman: Does Dr. Monckhoven state that in his paper?

Captain Abney: I think not; he rather advocates the discarding of the purple tints, and using those produced by iron.

Mr. Bolas, in continuation, said he had tried the oxide of iron, but he could only get a brick yellow colour—nothing approaching brilliant reds and violets obtainable by other means. Dr. Monckhoven recommended these oxides to tissue makers, but he hardly gave sufficient working directions to enable them to try them. Moreover, he said he used the oxides of other metals, but did not say what these metals were. With regard to the hydrated oxide of iron, he very much questioned whether this oxide was not as liable to undergo change as any other pigment. It was certainly liable to change under the influence of heat, and it was worth while experimenting to see whether it was not also affected by light, especially when in contact with organic matter. This was a point which he (Mr. Bolas) hoped before long to be able to try, and it might be as well also to try the oxide of the other metals in the same way. With regard to the slight change of colour which alizarine is said to undergo, the change was exceedingly small—certainly not more than was seen in other materials, and even in wood, leather, or paper.

Colonel Wortley observed that he had printed a large number of carbon transparencies, but had not noticed any sign of fading. Some of these had been exposed for more than eighteen months, and had had their due share of sunlight, but he could not see any change. Of course no portions had been covered up. He did not know what was in the tissue, because he only used that prepared by the Autotype Company, and which was prepared specially for him, giving the most beautiful effect. With regard to Mr. Fry's remarks as to watching the picture during the progress of printing, he very much preferred when a printer could not do so. If he gave a printer twenty sea and sky negatives he simply gave him the letter of the actinometer for each, and was absolutely certain (if the tissue had been properly prepared) of the prints being alike month after month and year after year. This certainly was not the case with albumenised prints.

Mr. Sawyer, in referring to the paper of Dr. Monckhoven, said that it had been long known that preparations of cochineal, when introduced into pigment and exposed to light, showed a difference of tone; and the letter he read from Mr. Swan quite bore out the idea, although he must say in a somewhat exaggerated form. It was, however, just possible that the cochineal with which Mr. Swan experimented was not the preparation that was common to the best colour makers of the present day. It was, he might say, the practice of the Autotype Company, until two years ago, to employ cochineal in small quantities. They had had practical proof of its permanence, as prolonged exposure did not produce any perceptible change, although Mr. Swan had stated that twelve hours' exposure was enough to effect it. He might, perhaps, briefly state what it was that caused him to abandon cochineal entirely, and to try and find out some other substance in its place for combining with carbon pictures. When he introduced a mechanical printing process with colours he used the purple colour ordinarily used by lithographers, in ignorance of its peculiarly fugitive character. On one occasion he happened to see a mechanical print in Paris, and, to his amazement, the crimson tint had vanished, and the picture looked like a simple black engraving. He considered that if the colour behaved in this way it was time to seek out some other pigment. He made many experiments, and tried many colours of the metallic oxides, and at last fixed upon alizarine, which had already been tried at the Autotype works, but not with success. With the assistance, however, of Mr. Perkins, a method was indicated by which the alizarine could be introduced into the tissue. Before doing so, some alizarine was introduced into lithographic ink and used in mechanical printing, and the result was that it was found to be a permanent colour. He (Mr. Sawyer) then considered that if alizarine under such circumstances behaved so, under the protecting influence of gelatine it was likely to be still more permanent; he therefore thought it would be perfectly safe to use it. Dr. Monckhoven stated in his paper that if alizarine, prepared as he prepares it, was exposed to sunlight a few hours sufficed to cause a slight change. Since the last meeting, however, he (Mr. Sawyer) had prepared some alizarine prints, and had exposed them, a portion being covered, in the tower of the Autotype works, through a clear glass window with a southern aspect. These pictures he would now exhibit, to show that no change had taken place. He quite agreed that a trial like this could not be accepted as final, as the exposure was not of a very long duration. Dr. Monckhoven also recommended purple tints to be abandoned; but if we were confined to the brown colours the range would be very limited. Practically, in carbon printing, there were but three primary colours—black (which is the foundation), red, and blue, and to discard the latter would be to take away at least one-third of our power at once. Again: Dr. Monckhoven told us very specifically how to prepare alizarine according to *his* method; but in regard to the hydrated oxide of iron no information whatever was given that was of the slightest use. However, as the researches were to be continued, possibly Dr. Monckhoven may tell us more at a future time. If anyone would take the trouble to go through experiments with peroxide of iron it would be seen that the colour, in the ordinary way of using it, was of no use so far as the manufacture of tissue was concerned. No doubt Dr. Monckhoven would supplement what he had stated by giving the exact process; but all he (Mr. Sawyer) could now say was that the alizarine colours, which were known in dyeing as permanent, had resisting powers which entitled them to be classed among permanent pigments. Now that the manufacture of tissue had been thrown open, a great advance might be anticipated from the chemical knowledge which would be brought to bear upon it. At the same time it should be borne in mind that no one was more entitled to honour than the first introducer, Mr. Swan. The reproach to photography was its want of permanency, and he (Mr. Sawyer) maintained that the carbon process of Mr. Swan had done more to raise photography to a high level than almost anything else.

Mr. Spiller wished to know from Mr. Sawyer whether he had made any experiments with an extra scarlet shade of alizarine prepared by Mr. Perkins. This preparation gave a brilliancy almost equal to cochineal.

Mr. Sawyer was not aware that there was any special scarlet shade made. When he first became acquainted with alizarine there were two kinds made—the blue shade and the red. He tried the blue, but he found that it certainly did not stand exposure to light. He then turned his attention to the scarlet, and found that satisfactory. What they now used was, he believed, the ordinary commercial product.

Mr. Spiller observed that there were now six shades of alizarine.

The Chairman was glad that so much time had been devoted to the discussion of Dr. Monckhoven's paper. The information afforded in Mr. Swan's letter, in Mr. Bird's communication, and in Mr. Sawyer's remarks, was most valuable, and he hoped that the discussion would be resumed at some future time, and that Dr. Monckhoven would give a second paper on the subject.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held on Thursday, the 4th inst.,—Mr. Frank Howard, Vice-President, in the chair. Mr. George Maitland having been elected a member,

Mr. E. W. Foxlee read a paper *On the Use of Alcohol in Gelatino-Bromide Emulsions.* [See page 172.] During the reading of the paper Mr. Foxlee submitted for examination a number of bottles containing the gelatine preparations to which he had alluded.

Mr. W. Wainwright, after referring to the addition of oil of cloves to gelatine, inquired if the presence of alcohol affected the sensitiveness of an emulsion.

Mr. Foxlee said that he had been unable to discover any diminution of sensitiveness.

Mr. Mawdsley stated that it appeared to him that Mr. Bennett's remarks at the previous meeting had been imperfectly understood by some of the members. The view of the interior of an artificially-lighted room then exhibited had been obtained in the camera on a dry gelatine plate. He had been present when Mr. Bennett was operating, and could testify to the extreme sensitiveness of his plates. In further proof of this he (Mr. Mawdsley) submitted for examination several negatives of interiors lighted by means of common gas, and taken at night, the exposure of one of these having been twenty minutes.

Mr. Kennett observed that gelatine varied very much in quality, no two samples being quite alike. The addition of alcohol to gelatine, in his experience, prevented the negatives from being of a fine quality. It was always best to use gelatine fresh; he invariably preferred to do so within five hours after its preparation.

The Chairman, alluding to the tendency of advocates of processes to claim for them a great degree of sensitiveness, observed that the time of exposure required for some of the slow processes might be materially reduced by the adoption of a proper alkaline developer.

After some remarks by Mr. Pearsall, a number of negatives and prints were exhibited by Messrs. Brooks, Nesbitt, and others. Those by Mr.

Brooks were enlarged by collodion emulsion; they were of great dimensions, and quite free from texture. Mr. Nesbitt's pictures indicated a high degree of sensitiveness, and this may also be said of some by Lieut. Lysaght exhibited by Messrs. Wratten and Wainwright.

Mr. W. M. Ayres exhibited an appliance, moved by clockwork, for ventilating a studio. It consisted of a wide strip or flange of tin wrapped spirally round a central rod which was geared into the clockwork. This rotated in a cylinder up through which the heated air was drawn and emitted. Mr. Ayres also exhibited several vessels of glass for dissolving crystals.

The thanks of the Society having been tendered to Mr. Foxlee for his paper, it was intimated that at the next meeting a paper would be read by Mr. W. Brooks *On the Enlargement and Multiplication of Negatives by Emulsion Processes.*

The proceedings then terminated.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The sixth ordinary meeting of the above Society was held in 5, St. Andrew-square, on Wednesday, the 3rd inst.,—Dr. Thompson in the chair.

The following gentlemen were unanimously elected ordinary members of the Society:—Messrs. T. N. Christie, Francis Briglemen, W. Maule Borley, F. Moore, W. Iveson Macadam, and James Lyle.

Mr. W. T. Bashford then read a paper contributed by Mr. Payne Jennings—*Remarks on Landscape Work and its Relation to Art.* [See page 171.] The paper was illustrated by a large number of exquisite landscape studies, which excited the enthusiastic admiration of all present.

The Chairman, referring to Mr. Jennings' contributions, remarked that he had heard many papers read on artistic matters, but none with more practical value. The author had illustrated his remarks by works of his own production, showing that the writer had much more than theoretical ideas to treat upon, having reduced all he had to say to practice, as shown by the very numerous art-productions exhibited.

Mr. W. Nelson said that while on a visit to Pitlochrie, he had, of course, admired the beautiful scenery; but, when he desired to take photographs of some of the views, he found the greatest difficulty in selecting a scene that would be harmonious as a photograph.

Dr. Hunter had experienced great difficulty in selecting a point of sight that would render within the bounds of one negative a harmonious composition which might justly be called a picture, and congratulated Mr. Jennings on his great success in this particular. The difficulties surmounted greatly enhanced the value of such renderings of nature as Mr. Jennings had submitted to them.

Mr. Mickie was greatly impressed with the peculiar picturesque beauty of some of the illustrations, and knew that such results could only be obtained by one possessing high art-feeling, being at the same time one who could "bide his time" till nature was in a favourable mood to assist him in rendering his conception of the scene, and who, when the right moment arrived, also possessed the necessary ability to seize and perpetuate it. From his own profession as an artist he knew some of the difficulties a photographer laboured under, as to a very large extent he must render forms exactly as they are, and he is not at all times able to control or modify repeating lines and objectionable features, though they could be altered to any extent if rendered by hand. Bearing these difficulties in mind, he was much impressed with the triumphant vindication of the art possibilities of photography as exhibited in some of the pictures by Mr. Payne Jennings.

Mr. M. G. Dobbie remarked that numerous papers had been read to the Society bearing more or less directly on the relation of art to the science of photography, and requests had been made over and over again to our artist members to accompany the Society on its outdoor excursions, and practically instruct the members in really artistic work. In more instances than one this had been done advantageously. Now in this paper of Mr. Jennings' we had the result of that gentleman's experience in a practical shape, and when combined with such an authority it was of the highest value. There could be no doubt about the fact that one of the essential requisites—indeed, the leading element in the production of a good photographic landscape picture—was artistic knowledge on the part of the operator; in fact, it required brain work, and a correct idea of the beautiful in nature in order to stamp the picture with a true sense of individuality and excellence. No amount of mechanical skill, without the element just referred to, would or could produce a landscape picture in an artistic sense. Mr. Jennings had demonstrated the truth of this in such a way that no one could contradict; not only so, but the very beautiful examples of his own work which accompanied his paper gave practical illustrations of the fact. Mr. Jennings, judged by his pictures alone, was an artist possessed of fine discriminating taste and judgment, and he combined with that an enthusiastic love of the photographic art; hence his success—a success which has gained for him a world-wide renown. He (Mr. Dobbie) concluded by proposing a vote of thanks to Mr. Jennings.

The motion was carried unanimously.

Mr. John M'Kean then exhibited a new camera and tent combined. This was a very ingenious apparatus, being a perfect dark tent for wet-plate photography in the field, and, at the same time, a camera, enabling the operator, if desired, to watch and modify the negative while being exposed, so that various times could be given to different parts of the view, allowing a harsh, badly-lit foreground to receive sufficient exposure without overdoing the delicate distance, and also securing on the one plate an instantaneous cloud effect. A yellow window facing the scene enables the operator to select the most favourable time to impress the plate, and several original and ingenious appliances are introduced to facilitate operations and reduce to a minimum the troubles and somewhat bulky *impedimenta* that the ardent wet-plate worker has to contend against compared with his dry-plate brother. The whole is intended to stand on a very rigid form of tripod. The apparatus in all its details was examined with much interest, and a vote of thanks was heartily accorded to Mr. M'Kean.

The Chairman next submitted a proof impression of the presentation print for the current year. It is a beautiful reproduction of Sir Noel Paton's well-known picture, *I Wonder Who Lived in There,* and all members who have paid their annual subscription of five shillings will be entitled to a copy of it. The picture is of large size, beautifully printed in pigmented gelatine by Mr. W. H. Davies. It is mounted on cardboard with a tint, and has a suitable engraved title. Of course it is worth in itself far more than the annual subscription to the Society, and it is recommended that all persons who wish to become possessors of this really fine work should send in their subscriptions at once, as only the exact number of copies absolutely required will be printed, this being one of the conditions attached to the artist's generous permission to reproduce the picture.

In the question box was found an inquiry as to the manufacture of collodio-bromide emulsion used by many members of the Society.

Mr. A. Mathieson said the details had been so often explained to the Society, and published in its reports, that any one could by referring to The British Journal of Photography find all the working particulars with formulæ; still, as a good many inquiries had been made since the last meeting of the Society, he would again give the formulæ. The collodion is what is known as Mr. Aird's, and is almost identical with that published by Messrs. Sayce and Bolton about twelve years ago:—

Ether (methylated)	6	drachms.
Alcohol (pure)	2	,,
Pyroxyline	6	grains.
Bromide of cadmium (anhydrous)	6	,,
Bromide of ammonium	3	,,

The sensitising solution for one ounce of salted collodion is composed of—

Alcohol (pure)	2	drachms.
Nitrate of silver	12	grains.

Place the silver in a test tube, and add a few drops of distilled water. Apply heat until the silver is dissolved; now add the above alcohol. Shake, and re-heat in order to redissolve the silver which, most probably, has been thrown down in a fine powder when the cold alcohol was added. Now add this alcoholic solution of nitrate of silver, a drop or two at a time, to the salted collodion, shaking vigorously after each addition. Let the test tube rest in a cup of hot water while shaking the collodion, in order to keep the nitrate of silver dissolved. Test the emulsion thus prepared, and see that there be a very slight excess of bromide; it will then be found neutral on the following day. When the emulsion has been made about two days it is better than when quite new, and if neutral it will keep indefinitely. Coat the albumenised plates with the emulsion, and wash under the tap till all greasiness disappears; then apply the preservative:—

Tannin	10	grains.
Sugar	5	,,
Water	1	ounce.

This makes a hard, sensitive film; or common bitter beer may be used instead, when the plates are less sensitive. The plates require to be "backed." The tannin-preserved plates necessitate bromide to prevent fogging, and also require that the plates be flooded with alcohol previous to development in order to soften the film. The beer plates do not need bromide, and only require the backing to be removed with a damp sponge and to be simply washed under the tap prior to development, which is, of course, the ordinary alkaline pyro.

Votes of thanks brought a most enjoyable meeting to a close.

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

The ordinary meeting of this Society was held on Monday, the 4th ult., at the Oddfellows' Hall, Bradford, at 7.30 p.m.,—Mr. E. Greaves, the President, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. John Garbutt read a paper on *The Volumetric Estimation of the Strength of Solutions of Silver Nitrate, and the Recovery of Silver from Wastes.* [See page 173.] In reply to a question,

Mr. Garbutt said that caustic potash would do as well as caustic soda. The actions of the two compounds were very similar; there being a very beautiful analogy between the two substances. The only difference was that chloride of sodium was easier to eliminate than chloride of potash, and that an oxide of silver was produced when potash was used, which could readily be detected by the neutrality of the solution. If oxide of silver were not present the solution would be alkaline. In reply to another question as to the method of treating developer waste containing citric acid, he (Mr. Garbutt) said that owing to the strong affinity of chlorine for silver the action of the citric acid might be overlooked; the addition of chloride of sodium would precipitate all the silver; and the other products would be very soluble and easily washed away. Hyposulphite of soda solutions were not worth the trouble of saving.

The question of the best method of dealing with paper-waste being introduced,

Mr. Garbutt said the matter was such a lengthy one that he could not deal with it that evening, but promised on some future occasion to read a paper on that particular subject.

The discussion was then dropped, and a hearty vote of thanks was passed to Mr. Garbutt, and by him suitably acknowledged.

The meeting was then adjourned.

Correspondence.

IMPROVEMENT TO THE FERROUS OXALATE DEVELOPER.

To the Editors.

Gentlemen,—I have obtained a marked improvement in the use of the ferrous oxalate developer by the addition of *gallic acid.* The image is richer and brighter, and comes out more rapidly. If the materials are good, and are properly used, fogging seems to be almost impossible.

For this purpose gallic acid may be kept in alcoholic solution. Sixty grains to the ounce is a convenient strength. The alcoholic solution does not, as in the case of pyrogallol, deteriorate by keeping. I have now a bottle of solution, made a year ago, which is in excellent order.

The solution of ferrous oxalate in potassic oxalate does not keep so well, and is best made fresh at shorter intervals.

A peculiarity resulting from the addition of gallic acid is that the development extends much farther down through the film than when the oxalate is used without it. Intensity comes more readily than with the plain oxalate, and much more readily than with the alkaline pyrogallol development.

The proper proportion is from four to six drops of the sixty-grain solution to the ounce of developing liquid. It should be added after the strong solution of oxalate has been diluted to the strength intended to be used. Generally this addition somewhat blackens the solution; but this does not affect the development, which is a particularly clean one.

In a letter from Mr. Alexander Henderson, of Montreal, that gentleman mentions that he finds the use of the oxalate developer with gelatine plates removes all the difficulties usually encountered in that branch of dry-plate work.—I am, yours, &c., M. Carey Lea.

Philadelphia, March 25, 1878.

VERTICAL AND HORIZONTAL LINES.

To the Editors.

Gentlemen,—Amidst the war of words about vertical and horizontal lines it strikes me that no appeal has been made, on either side, to the inexorable logic of figures. The most irrelevant assertions have been made; and, in more than one instance, repeating a statement appears to have been thought equivalent to proving it. A little calculation would be of more value than pages of unsupported talk. Let us suppose an outsider, with no bias either way, to inquire for some actual data on which to form an opinion. I propose to offer him a few for his guidance. If their evidence be disputed, it may be refuted, in like manner, by figures.

I shall take a tower 40 feet square, 165 in height, viewed by an observer 300 feet distant from its base, with his eye five feet from the ground. How far is the top of the tower from his eye? Any one accustomed to similar calculations will in a few minutes satisfy himself (*Euclid* I., 47) that the answer is 340 feet; that is, the top of the tower is 40 feet further from the observer's eye than the base, or about one-tenth part of the whole distance.

I next turn to the law of vision, which makes the relative size of objects depend on the angle any object subtends (or is opposite to) at the observer's eye. The nearer it is the larger it looks; the further off the smaller. I am not speaking now of surfaces, which, for an obvious reason, founded on the law just mentioned, vary as the squares of the distances. Linear dimensions appear to vary as the distance. A line twenty feet off will seem twice as long as the same line viewed from a distance of forty feet, and so on.

Well, then, applying this to our tower, we first remark that the top and bottom of one side of it are in reality the same length (forty feet); but the top is observed from a point one-tenth part farther off than the bottom. It will therefore appear less; but how much less? Why, also one-tenth part, or some four feet less. Each apparently vertical side of the tower, therefore, inclines towards the other, two feet in 160, or one in eighty; and if we suppose a photographic print to represent the tower as six inches in length, the base line would then be an inch and a-half long, and the top one-tenth less, or about one-eighth of an inch. Here, then, is a demonstration that really vertical lines are not seen parallel in certain given conditions. The camera swing-back would, of course, put all to rights; or, if possible, a more distant point of view be selected.

How important this may be appears if we assume the distance of the observer from the base of the tower to be 500 feet instead of 300. In this case the top of the tower is only twenty-five feet further from the point of view than the bottom is, or one-twentieth the whole distance. Everything is, of course, diminished in size, but the top in a smaller ratio to the bottom than before; so that if (say) an inch and a-half represents the bottom of the tower in a photographic print, a little more than one-sixteenth of an inch would represent the difference of length between top and bottom, the image of the tower being supposed six inches in height.

Thus much regarding vertical lines. As I have already, I fear, trespassed too seriously on your space, I reserve my remarks on horizontal lines till another opportunity, if you are favourably disposed to receive them also.—I am, yours, &c., J. Stothert.

Clapham, April 8, 1878.

TINTED CHROMOTYPES.

To the Editors.

Gentlemen,—I, and I am sure the majority of the profession will do the same, emphatically protest against the claims of Sir Thos. Parkyns.

The adding of pigments to collodion for several purposes has been known and practised for years, and unless the applying of two known processes together entitles a person to the protection of a patent, I cannot see the right of Sir Thos. Parkyns to monopolise this idea.—I am, yours, &c., T. S. Hicks.

April 6, 1878.

[It is a very well-recognised fact that a valid patent can be made by the combining of two or more previously well-known processes.—Eds.]

"VOIGTLANDER'S NEW LENS."

To the Editors.

Gentlemen,—Circumstances have prevented our seeing till this morning Herr Voigtlander's reply to our letter respecting the above lens, which reply was communicated to you by Mr. R. W. Thomas on the 25th March.

Will you allow us now simply to remark that we can fully justify all we stated in our former letter, and, would time permit, should be pleased to do so at once; but as such will not, and as Herr Voigtlander chooses to infer that ours is only a "superficial knowledge of the matter," we shall communicate with Herren Steinheil, and ask you to be good enough to insert their opinion in a future letter upon this subject.—We are, yours, &c., Murray and Heath,

Agents for C. A. Steinheil Söhne.

69, *Jermyn-street, S. W., April* 10, 1878.

Photography in Court.—At the Bloomsbury County Court, on Monday, the 25th ult., the case of Nicholl *v.* Sagers was heard before Mr. Judge Russell. The plaintiff, a photographer in Grafton-street, sued the defendants—two ladies having a ladies' boarding school in Camden-road—to recover the sum of five guineas, being for the value of a quarter-plate negative and twenty proofs from the same, ordered on stated terms and at the plaintiff's request.—The plaintiff stated that in October last one of the defendants requested him to arrange for taking a photographic group of the young ladies attending the school. He found that the group would consist of eighteen pupils, exclusive of the defendants. He mentioned the price at the time, which not being objected to he completed the work and forwarded his account, but in consequence of non-payment he brought the present action.—The plaintiff's assistant, who was present when the order was given and who assisted in the operation, was called in support of the plaintiff's case.—Mr. Lewis, who appeared as solicitor for the defence, urged that the price was an excessive one, and his clients would state that they were generally dissatisfied with the plaintiff's work.—Both defendants denied that any sum was agreed to at the time the order was given, and they had told the plaintiff that they were not pleased with the pictures. The plaintiff had taken four large negatives before he was pleased with the result, it being a difficult task to get eighteen school girls to be perfectly steady while the group was being taken.—The Judge said he could well imagine that, and then asked the plaintiff if he was quite sure the sum for which he sued was mentioned at the time the order was given.—The plaintiff said it was, and that the amount and character of the work were never objected to till he pressed for payment. One of the proofs was produced by the defendants, who complained of the indistinctness of part of the group. The plaintiff replied that although he had a very quick lens it was impossible that all the group would remain steady.—The Judge: exactly so. I suppose the eighteen young ladies are not in Court?—As none were present, his honour, in giving judgment, said that considering the picture represented eighteen young girls he thought that under the difficulty in which the artist was placed he had executed the task in a very creditable manner, and that if the defendants had any cause of complaint at all they should have made it before proceedings had been instituted against them.—Judgment was then entered in favour of the plaintiff for the full amount claimed, with the costs of one witness.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A prism for taking reversed pictures will be exchanged for repeating-back *carte* camera or burnisher, or anything useful.—Address, Photo., Alexandra-cottage, Christ-road, Bournemouth.

Grubb's C 2 portrait lens for plates 10 × 8 (nearly new), with diaphragms, will be given in exchange for Ross' No. 3 or 4 rapid symmetrical or triplet.—Address, Geo. Duncan, Tanfield, Edinburgh.

Whole-plate camera and Ross' doublet, Howard tent (home-made), tripod, 5 × 4 dish, air-tight bath, printing-frames, half-plate French portrait lens, chemicals, &c., will be given in exchange for gentleman's gold watch.—Address, J. W. Danter, Avenham-villa, Llandudno.

ANSWERS TO CORRESPONDENTS.

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

North Star.—The copyright in the picture will expire in 1882.

F. Prince.—There is no necessity for undue haste in returning the prints.

Pylos.—Instead of replying directly to your questions we prefer referring you to a very complete series of articles on the reduction of residues by Mr. E. W. Foxlee, which we published in this Journal a few years ago. You will there obtain all the desired information.

E. D. (Weymouth).—There is a collodion in the market well known for possessing qualities diametrically opposite to that about which you write. We recommend that a mixture be made of the two. Yours will also be improved by the addition of a little "tough" cotton.

Bothered Photo.—From the graphic description given by you of the evil doings of the negative bath it seems to be high time that it was reduced and sent to the refiner. After a bath has been in use for five years it may certainly be allowed to retire in favour of a successor.

E. H. E.—When the iodide of silver formed by the immersion of a collodionised plate in the nitrate bath falls away from the surface it is an indication that the collodion is over-iodised. To rectify this add to it a small proportion of plain collodion. This will prove an infallible remedy.

J. O'B.—If you put your query in a more definite form we may offer an opinion as to the patent. At present we cannot quite perceive your drift, nor can we clearly understand the nature of the information you wish to obtain. When you write again number your questions, and enclose an envelope for a private reply.

P. O. J.—Achromatism in a lens has nothing to do with curvilinear distortion—a fact that may be practically tested by mounting two meniscus spectacle glasses a little distance apart from each other and placing a diaphragm between them. Mount the objective thus formed in a camera, and you will find the marginal lines to be quite straight.

Chromotype.—The minute specks on your carbon prints are caused by "particles" of air imprisoned by the action of the squeegee instead of being expelled by it. If you *pat* a globule of mercury lying on a flat table by means of the side of a knife the globule, instead of flying off, becomes broken up into innumerable particles; so with the action of the squeegee in your case.

Rev. J. McD.—The effect you describe is easily explained. The binocular picture is *pseudoscopic;* that is, its foreground and distance have changed positions with each other in respect of the relative degrees of convergence caused to the optic axes when examining them. Remove them from the mount and transpose them; all will then be right and the picture will be stereoscopic.

M. A. (Oxon).—The following method of preventing the formation of blisters in albumenised paper prints has been recommended:—Soak the prints, after toning, for ten minutes in a solution composed of an ounce of alum to two pints of water; they must then be transferred to the fixing bath. Give this method a trial, and if it prove the means of ridding you of the annoyance complained of so much the better.

Theta.—A simple method of washing collodionised plates is to put a number of them in a flat tray of large dimensions, and place a small rod of wood, the thickness of the finger, under and across the bottom, so that an oscillatory motion may be imparted to the tray. In this manner a dozen of Fothergill plates may be washed with great evenness. The sensitising may be effected in a similar manner.

X. Y. Z.—To blacken brass by staining it, first make it quite clean and apply a solution of chloride of platinum. Another method consists in mixing together solutions of nitrate of copper and nitrate of silver, applying this to the brass by means of a camel's-hair brush, and then submitting it to considerable heat. This latter method is objectionable in the case of articles that have been put together by the aid of "soft solder."

Geo. Tanner.—Do not give yourself any annoyance concerning the diaphragms; they are all right enough. You may study with advantage any elementary chapter on the construction and uses of diaphragms, such as that which was published in our Almanac for 1870. So far as we recollect no treatise on this subject has been published since that date. You may also consult Dr. Monckhoven's treatise on *Photographic Optics*, in which he deals with this subject in a very able manner.

Poco.—To alter the name under which the business has so long been carried on would be a very unwise proceeding on your part. Continue to carry it on as at present, until you have had at least six months' experience of its working, after which you may introduce changes in its designation should you then consider it wise to do so. Lose no time, however, in introducing as many photographic novelties as you can, and let the public discover from the style of the work that a new hand is at the helm.

F. W. T.—It has been found that glacial acetic acid exercises a solvent action upon some of the resinous constituents of gutta-percha. This is precipitated as a white mass when water is added. A strong solution of nitrate of silver also acts upon gutta-percha; but while we are only too well aware of the fact that a nitrate bath becomes spoilt from the absorption of organic matter by being kept in a gutta-percha receptacle, we are not in a position to indicate in accurate terms the precise action that takes place. Ebonite not being open to the same objection as gutta-percha, we recommend its adoption in preference to the other.

Rapidity (Bolton).—Certainly an "ordinary" dry process would be too slow for your purpose; but if you consult our advertising pages you will find that processes and plates that will prove suitable for instantaneous work are accessible to all. It is only three weeks ago since we described dry-plate negatives some of which had been obtained by an exposure estimated at the one-twentieth of a second, followed in the next number by a detailed account of the process employed. The kind of lens that we recommend you to employ is a half-plate portrait lens corrected for flatness of field and worked with full aperture, or nearly so, upon a 5 × 4 plate.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.

Collodion Transfers.—From Mr. R. Stuart, of Chiswick, we have received two excellent enlarged collodion transfers. The whites are pure and the tone is good. Specimens of this kind amply bear out all that was said with respect to this process of producing enlargements in the editorial chapters on the subject in our Almanac for the current year.

GOOD FRIDAY.

Owing to our usual day of publication next week falling on Good Friday we shall go to press a day ealier than usual, and publish on Thursday, the 18th instant. Advertisers and correspondents will please bear this in mind.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.
For the Week ending April 10, 1878.
These Observations are Taken at 8.30 a.m.

April.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
4	29·78	NW	38	40	55	34	Hazy
5	29·83	WNW	42	45	50	38	Fine
6	30·17	W	38	39	54	35	Foggy
8	30·01	SE	43	47	53	40	Foggy
9	29·98	E	42	47	53	40	Cloudy
10	29·95	E	43	46	52	42	Cloudy

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 937. Vol. XXV.—APRIL 19, 1878.

THE FERROUS OXALATE DEVELOPER.

It now remains to fulfil the promise we made last week to add to our remarks upon this subject by narrating our experience with different methods of compounding the developing solution, and the various effects produced by using it in a more or less concentrated state. Nearly all previous writers on the subject have confined their remarks to the behaviour of a concentrated, if not saturated, solution, having been led thereto, no doubt, by a desire to ascertain to the fullest extent the capabilities of the new developer. But though, as we have already pointed out, the energy as well as the relative density of the image are dependent to a great extent upon the degree of concentration, we are far from believing that it is either necessary or desirable to so employ it upon all occasions, though for special purposes it will be found highly useful.

The solution we have chiefly employed has been made as follows, and we lay particular stress on the method of preparing it, as some uncertainty will be thereby avoided:—One ounce of neutral potassic oxalate is dissolved in water to form a saturated solution, which will necessitate the employment of about three ounces of water. If the latter be used *hot* (which may be considered desirable in order to facilitate the solution) *it should be allowed to cool before proceeding further.* We lay this down as one of the requirements, because the hot solution dissolves a larger quantity of ferrous oxalate than when cold, though, as we employ a limited quantity of the latter salt, this would not be of much consequence. A more serious objection is found in the fact that the hot solution does not appear to keep so well as one made cold, depositing, after a day or two, a considerable crop of crystals which do not redissolve unless fresh water be added. This does not occur with the cold solution; hence we think the latter offers the greatest chance of uniformity of action. To the above quantity of cold saturated solution of potassic oxalate we add one hundred and twenty grains of ferrous oxalate, and allow it to stand for three or four hours with an occasional shaking, after which it is filtered. This forms, we think, the most concentrated form of the solution consistent with stability.

For very rapid exposures, or for subjects comprising harsh contrasts, the solution may be employed at this strength with advantage. In printing transparencies it may also be employed in conjunction with a short exposure, in order to obtain depth and brilliancy without having recourse to pyro. and silver. For general landscape work, however, it will be better to employ it in a state of dilution, the strength we have found to answer best being one part of saturated solution to two of water, though we have used it as weak as one in ten with the only difference that the action was slower and the density less, especially in the feebler portions of the picture. With an ordinary exposure—that is to say, such an exposure as we should give when not striving after extreme rapidity—there does not seem to be any falling off in the power of bringing out detail when the solution is as weak as one in six, though beyond that a longer exposure becomes necessary to produce a similar result. With the weaker solution, however, much more is left to the action of the intensifier. It is impossible to give any very definite instructions as to strength, so much depending upon other conditions; but we have said sufficient to show that a pretty wide margin exists, and, on the whole, we see no necessity, except upon economical grounds, to carry the dilution further than we have stated above.

On the score of economy—though we should be unwilling to reject the strong solution on that ground solely—it will be found, at the present market price of the ingredients, to be considerably more costly than the old method with pyro. and ammonia. This will be easily recognised when we state that the potassic oxalate is soluble in about three parts of water, and that each ounce of this saturated solution is capable of dissolving, as far as our experience goes, between thirty and forty grains of ferrous oxalate. If we set one ounce of potassic oxalate and (say) forty grains of the ferrous salt dissolved in three ounces of water against an equal bulk of a three-grain solution of pyro. at ordinary commercial prices we shall find there is a very considerable margin in favour of the latter. Against this, however, it is only fair to say that the ferrous-potassic oxalate solution presents a power which alkaline pyro. does not possess in common with it, namely, the capability of being used repeatedly without material loss of energy.

We are not yet in a position to speak decidedly as to the full limit of this power, not having made it the subject of any strictly comparative tests; but we are able to state that three or four plates which have received ordinary exposures—that is, which require no forcing in development—may be brought out successively with the same quantity of solution. Further than this the solution, after being once used, has been allowed to stand exposed to the atmosphere in an uncorked bottle for several days, and was then found to exhibit no noticeable difference in action as compared with a fresh and unused solution of the same strength. Unlike alkaline pyro., the solution of ferrous oxalate undergoes no *apparent* change during development. This is, no doubt, partially explained by the depth of its original colour, which would render any slight alteration in that respect indistinguishable; but no deposit occurs in the solution, at least for some considerable time after its use, and, as far as we can judge, not at all if precautions be taken to preserve it as far as possible from contact with the atmosphere. The solution, whether used or unused, if exposed to the air gradually deposits a rusty, yellowish-brown sediment, and if in a concentrated state crystals also.

It will be interesting to ascertain by careful comparative trials to what extent the solution loses in energy by contact with an exposed film and with the atmosphere during development, as, if we are correct in the estimate we have formed of this phase of the subject, it appears to involve a principle which will add greatly to the facilities this agent affords to the travelling photographer. This principle was shadowed forth in the suggestion of Mr. J. W. Swan as to the employment of a dipping-bath for the development. Now that, of course, necessitates the use of a considerable bulk of solution, and consequently its re-utilisation for a number of plates—a method which has been tried, but not with the most satisfactory results with the ordinary iron developer. To a slight extent it has been practised with alkaline pyro., successive plates being developed in a dish, the same solution being employed; but the chemical conditions involved in the use of the new developer are so entirely different that we may fairly expect to find it succeed under circumstances where the other two have failed.

In the case of the ordinary iron solution, for instance, which requires the co-operation of free silver nitrate, a very rapid loss of power ensues from the introduction with each successive plate of a quantity of silver much in excess of what is actually required for the formation of the image; so great is this loss that no two plates are developed alike, while the possibility of obtaining the best results by such a mode of treatment is more than doubtful. If we turn to alkaline pyro. the prospect is but little improved, as, after the addition of the alkali, the pyro. is oxidised so rapidly even without atmospheric contact that it soon loses its power of development. Certainly it may be renovated by fresh additions of the ingredients; but this does away at once with any possible advantage which might accrue from the re-use of a quantity of solution, besides introducing considerable uncertainty.

Ferrous oxalate, on the other hand, presents in itself a perfect developer requiring no further addition to render it active. It is free, then, from the rapid deteriorating action of the large excess of silver, as in the case of ferrous sulphate, while being comparatively permanent in itself, and but slowly acted upon by the atmosphere, it is not liable to the same spontaneous decomposition as alkaline pyro. If we add to this the fact that the presence of a soluble bromide does not appear to act injuriously upon its developing power, it will be evident that any accumulation of bromine or soluble bromide derived from the film itself during development is not likely to interfere with the results obtained. The deterioration in its power appears, then, to be narrowed down to the comparatively small effect produced by the reaction of the developer upon the exposed portions of the plate, and, having cleared the ground thus far, we have a better chance of success in employing ferrous oxalate for repeated development than is offered by any other developer in ordinary use. This view is strengthened if we look at the theory of the action of ferrous oxalate. Presuming that the production of an image is accompanied by the conversion of the ferrous into ferr*ic* oxalate, we have the formation of a salt which is freely soluble in water without the aid of potassic oxalate. A portion of the latter contained in the developer is thus set free to dissolve a fresh quantity of ferrous oxalate. The ferric salt exercises no developing action, nor, so far as we can ascertain, does it exert any restraining power, whence we may legitimately assume that the change which takes place is merely a diminution in the active power of the solution. If the correctness of our ideas be borne out by more crucial experiments it will be possible for a dry-plate photographer, when travelling, to develope his plates *en route*, using for the purpose a dipping-bath or dish and a solution of suitable strength of ferrous oxalate. In preparing the latter an excess of oxalate of iron might be used, and the clear solution poured off from the sediment for use. After developing the day's plates the solution would be poured back into the bottle, well shaken, and would again saturate itself with ferrous oxalate, and become clear for next day's use, or, if needful, could be filtered.

For the benefit of many of our provincial readers who may be unable to obtain the ferrous and potassic oxalates without sending to London we append brief directions by which the developer may be prepared from materials obtainable in any country town. If the proportions which we give be adhered to the result will be, for all practical purposes, equivalent to the saturated solution we have given above. Dissolve 1,000 grains of ferrous sulphate in a sufficiency of hot water, and add half that quantity of oxalic acid, also dissolved in boiling or very hot water. The first addition will, in all probability, not cause a precipitate, but only a yellow colouration of the solution, and several hours should be allowed for the completion of the interchange of elements. If mixed over night the oxalate of iron will be found in the morning to have subsided in the form of a bright yellow powder, which may be purified by repeatedly changing the water, and then, if desired, it may be dried upon a plate or dish in the oven. The potassic oxalate is formed by dissolving three ounces of oxalic acid in twelve ounces of hot water, and neutralising by stirring in, gradually, four ounces of dry carbonate of potash. Strictly speaking, this quantity of carbonate is insufficient to quite neutralise the acid, being about sixty grains short of the theoretical quantity; it is desirable, however, that the alkali be not in excess, and as a slight excess of acid is of little consequence it is better to err on that side. When the solution has become cold it is poured on to the precipitated ferrous salt and allowed to stand for an hour or two, with frequent stirring, when, after filtration, it is ready for use. The above quantities may, of course, be reduced if it be desired to work upon a smaller scale.

DRY PROCESSES—ANCIENT AND MODERN.

II.—A HYBRID PROCESS.

The washed emulsion process possesses qualities so exceptionally its own, and of such recognised value, as to render it undoubtedly *the* process of the future. Contrast its simplicity with any other existing process: a plate having been properly cleaned is coated with an emulsified collodio-bromide, and by that one act everything is accomplished. No sensitising bath, no washing, no preservative. The plate is ready for immediate exposure, or it will remain good for months. Can we conceive of greater simplicity? That is impossible. But has the process no drawback to counterbalance such exceedingly great advantages? We reply—*None.* Plates are prepared with an ease undreamt of in earlier times; they are, as respects sensitiveness, on a near equality with wet collodion, and may be rendered even more sensitive; they are developed with great ease; and, lastly, they yield pictures of exquisite quality.

Why, then, it may be inquired, not stop here and ignore entirely the cumbrous bath process with its long train of other manipulations? We reply—One, at least, of these bath processes possesses a particular feature more pronounced than any emulsion method, and there are circumstances under which that feature may prove to be invaluable; we allude to the plates retaining the latent image for a long period after exposure. There is, of course, a limit to all things—even to the keeping properties of a photographic plate—and that limit was exceeded when an attempt was made a few weeks ago to develope a successful negative upon plates exposed in Central Africa by Mr. Stanley about three years since, the plates in the meantime having been subjected to violent alternations of heat, moisture, and dryness.

Readers of this Journal are well aware how we have thoroughly appreciated and practised the "hot water" collodio-albumen process of Dr. Ryley. A few years ago we placed on record the fact that we had applied this method of organifying a film to a purely-bromised pellicle as well as to the stratum of iodised collodion hitherto made use of in connection with this preservative. In what follows we shall explain in detail the method we adopted in a very successful attempt to combine the post-exposure keeping qualities so associated with albumen with the other excellent properties inherent in washed emulsion. We, first of all, prepared an albumen preservative as follows:—To the white of each egg we added an equal portion of water and ten drops of strong liquor ammonia. These were placed in a cylindrical glass jar, and the whole was beaten into a stiff froth by means of a piece of apparatus which, although we described it some years back, is still not known so well as it should be, for of all the egg-whisking appliances hitherto introduced we have found it to be the best. It consists of a cylinder, made of any dimensions, of perforated zinc. We have found, for experimental purposes, the most convenient dimensions to be those which will enable the cylinder to stand easily inside of a wide glass tumbler, its height being about an inch in excess of that of the tumbler. It is fitted with a modern top, in the centre of which is a hole slightly under half-an-inch in diameter, through which passes a wooden rod attached to a piston of solid wood which works freely up and down the perforated cylinder. The action is as follows:—The white of egg and other ingredients having been placed in the tumbler, the cylindrical albumen beater is introduced, and the piston rod (which terminates in a handle at the upper end) is quickly pushed down. This causes the albumen to be forced out through the holes in the cylinder, a return of this being effected by the same means when the piston is drawn up. By continuing this upward and downward motion of the cylinder for about a quarter of a minute the whole mass will be converted into a stiff froth. The beater is now washed, wrapped in paper, and put away for future use, while the glass tumbler or jar is covered for one or more hours, or until the froth has subsided into a pure limpid liquid requiring no filtration, and which will remain good and fit for use for several months.

The albumen being now in a state of readiness, we shall indicate the method of using it which we have adopted:—A plate is coated with collodion emulsion. We have not found a substratum necessary, as the albumen to be subsequently applied seems to bind the collodion film to the surface of the glass. When set the film is rinsed, perfect washing not appearing to be necessary. A small quantity of the albumen solution having been placed in a glass, it is poured over the surface and allowed to flow to each corner; it is a good plan to allow it to run off from each corner in rotation back into the vessel. The appearance of a half-rinsed collodion surface is familiar to most readers, the antipathy of the water to "take kindly" to an undried collodion pellicle causing a greasy appearance. In the process we are now describing this is not of the slightest consequence, as the alkaline albumen flows over the surface with an oily kind of smoothness.

While all this is being done, a flat, empty bath must have been placed in front of the manipulator, and a kettle of boiling water within reach of his right hand. Allowing the albumen to drip off from one corner a little fresh albumen is poured upon the surface, and as soon as it has been allowed to spread the boiling water is poured into the bath and the sensitive plate is gently slipped into it. The albumen is, of course, coagulated in a few seconds both on the surface and throughout the pores of the collodion—wherever, in short, it has happened to penetrate. The plate is now removed and is reared up to dry. Previous to its drying an application of a three-grain solution of gallic acid is found to be an improvement.

In the manner just described was prepared the plates which we subjected to a thorough trial both against some prepared by totally different processes and against others prepared with the collodion emulsion alone.

Bearing in mind certain statements made some years ago relative to the destruction of sensitiveness of bromised films by means of heat, we are now in a position to state that the sensitiveness is not affected by the amount of heat to which we subjected these plates in the course of their preparation.

In speaking of the quality of the negatives produced we may, first of all, premise that in a definite series of comparative trials we have recently brought to a termination we never exposed a hot-water emulsion plate without at the same time exposing, and for the same length of time, a plate prepared with the simple emulsion. The exposure we gave, with a lens having an aperture of $\frac{f}{15}$, was respectively ten and fifteen seconds in sunshine, and thirty seconds when the sky was overcast with gloomy clouds. When making use of an alkaline pyro. developer—a mixture of "sal." soda and liquor ammonia forming the alkaline agent present—both sets of plates showed the same amount of detail, proving that neither by the immersion in hot water nor by the albumen preservative was the sensitiveness of the bromised film diminished.

When making use of the ferrous oxalate developer the results were not quite equal to those obtained by the alkaline pyro.; but we do not regard our experiments in this direction as yet completed.

We close by giving in a few words the conclusions at which we have arrived as the result of our experiments. The emulsion employed was a commercial sample we have very often used with uniform satisfaction; it may be accepted as a typical preparation. If the plates are intended to be kept for a moderate period only after preparation previous to being exposed, and if they are to be developed very soon—that is, within a few days—after exposure, we see no advantage that can be gained by the subsequent treatment with albumen. It entails a little more trouble in the preparation of the plate, but does not produce a better negative. The film, however, is rendered much harder by the albumen preservative—so hard, indeed, that it may be briskly rubbed whilst wet without being torn. If the plates are intended to be kept for a long time both before and after exposure the albumen will be found of much service. The image is a little thinner, and of a browner colour, with the albumen than without it when the development has been carried out in a similar manner in both cases; but by treatment with acid pyro. and silver the density may be increased to an almost unprintable extent.

CITRIC ACID IN THE DEVELOPER.

It is not the least remarkable of the many strange facts of photographic practice that the solution used for developing a wet collodion plate is, in the vast majority of instances, identical in composition with that first recommended when the introduction of bromo-iodised collodion into studio practice became general. As a matter of course various nostrums and complications of formulæ arose, too numerous to mention, some being accepted as improvements in the first blush of publicity, others rejected without trying (such is photographic logic!), and others yet enjoying a popularity of greater or less duration, but still to be followed by their gradual disuse.

The changes have been rung upon all the available acids, mineral and vegetable, here and there an artist less conservative than his brethren finally adopting one of the novelties without any perceptible alteration in the character or quality of his work. Thus, we know of one celebrated photographer who for a considerable period made up his iron developer by the aid of sulphuric acid with a little acetic, with which heterodox mixture he used to produce marvellous effects—unsurpassable, in fact, by any method. We are not aware whether he still continues to make use of the same formula, though it is highly probable he does not.

All these facts conclusively prove that, vast as is the number of experiments that have been tried with various modifications, they have been of so inexact and unsystematic a nature that no trustworthy comparison can be made (at anyrate without an immense amount of labour), from published data, of the action of the various additions to the plain solution of sulphate of iron. We have of late been accurately testing the effect of different acids upon the appearance of the deposit and the peculiarities of their working; and, as a contribution to the subject, we shall proceed to point out the usefulness of one particular acid which has more than once of late had its praises sounded—citric acid.

Naturally, the first step that would occur to the mind in instituting such experiments would be to try the action of the proposed addition in a test glass by means of solutions of suitable strength, to which would be added small quantities of nitrate of silver solution. We have, of course, tried this plan, but upon rigidly comparing it with the effect of the same solution used upon the exposed plate we cannot conscientiously say that we have found anything like that entire accordance, either in the colour of the deposit or rapidity of precipitation, between the two processes which the common reputation of this method of trial would have led us to expect; and hence we made little or no use of it in finding out the value of each particular acid with which we experimented.

Rapidity being the great aim of all changes—its discovery being to investigators as the search for the philosopher's stone to the alchemist of old—our first experiments were to test the powers of citric acid in that direction, one of the claims made for it being that on account of the length of time it could be kept on the film without fogging a practical increase of sensitiveness followed. We repeated our experiments many times, but, so far from finding any decrease of exposure with its aid, we unhesitatingly condemn it as slow; in fact, it causes a most material increase in the time of exposure when tried against iron with acetic acid.

The most marked feature of its use is the very remarkable colour of the deposit as compared with that given by the familiar acetic acid and iron developer. With the latter the tone of a good, correctly-timed negative is a peculiar rich greyish-brown of good printing character; but the substitution of citric acid causes a great change, an equally well-timed negative being of a dense indigo-purple or ink-like colour, which, however, prints well enough. Further: the density of the deposit is so great with citric acid that no intensification with pyro. need ever be resorted to when the bath is in fair order.

It is evident from these statements that, for portraiture, citric acid is in every way inferior to acetic; but for copying engravings, maps, &c., it possesses characteristics which would seem to point it out as being especially useful.

We have also been able to make it very useful in another direction. A point in the development of dry plates upon which great stress has been laid is the power, by altering the proportion of the ingredients of the developer, of being able to get good negatives with a very wide latitude of exposure. So much has been made of this point that it might be supposed that with wet-plate development no such latitude could be allowed. This is so far from being really the case that, by the aid of citric acid, we do not hesitate to say we could make a good negative with an exposure much more than double that needed by an acetic acid developer. We do not mean that that is the usual ratio, but that it is possible to have the development under control to that extent—a power of no mean value on occasions. It is evident that it must be just as useful to have this command with wet-plate work as with dry. To obtain this effect all that would be necessary would be to make the developer of about nine or ten grains of iron to the ounce with a due proportion of citric acid, increasing its quantity according to the slowness desired.

We have in our wet-plate work been able to avail ourselves of this property of citric acid to some advantage. We always have at hand a supply of citric acid solution (if this be well boiled it will keep for a considerable time without becoming thick or "ropy"), and, when we find the image to flash up too quickly, we at once flood with water to arrest the development, if possible, before it is completed, and then, adding a few drops of citric acid and a good supply of silver solution to the same developer weakened by water to one-half of its strength, we find ourselves able to produce a negative perfect in gradation and with sufficient contrast; whereas without this aid nothing but a flat, grey, worthless result would have been obtained We need scarcely say that if we had from any cause good reason to suspect at first that the negative was much over-exposed, we should use citric acid in a weak iron solution in the first development, without waiting to see from the acetic developer whether the timing had been correct.

We may conclude our notice by stating that in practice we find one grain of citric acid to be equal to from twenty to thirty minims of glacial acetic acid. Their effects are so different in iron solutions that it is difficult to form a closer estimate than this. With pyrogallic acid we find the lower estimate to be about the due equivalent.

WOODBURYTYPE BLOCKS.

We are enabled to supplement our article on this subject, which appeared four weeks ago, by giving the text of a patent obtained by Mr. W. B. Woodbury for a similar purpose. Taken in connection with our recent article, it will prove a valuable contribution to our knowledge of this most important subject.

The title of Mr. Woodbury's specification is "Improvements in Photo-mechanical Printing, and in Apparatus and Appliances therefor." These improvements, he says, relate—

Firstly. To a method of obtaining by photography blocks suitable for employing with type in the ordinary method of typographic printing, either from a subject represented by lines, as an engraving or woodcut, or from a photograph containing only half-tones, as a portrait or landscape from nature, or a painting.

Secondly. To improvements in the process known and termed in the trade "Woodburytype," by which that process is rendered much simpler.

Thirdly. To an improved method of producing the same by machinery.

To accomplish the first part of my invention I proceed as follows:—Where the subject is in line I make a positive photograph of it (*i.e.*, positive by transmitted light), and from this I obtain a relief in gelatine by the ordinary method, the result being that the hollows of the relief will all be of one uniform depth, this characteristic producing a level or uniform surface in the resulting mould, which I make by impressing this relief into metal by hydraulic or other pressure, or by the method stated in the second part of this invention. Where the subject is in half-tone, as in a photograph from nature, I proceed as follows:—In printing on the gelatine film I interpose between it and the negative a photograph on mica or transparent collodion of what is known as musquito netting, or Brussels net, which breaks up the resulting relief into a multitude of fine square or hexagonal lines. To obtain from this a printing block I employ the means already described, the resulting block in soft metal being capable of giving from one hundred to two hundred impressions; but where large numbers are wanted I electrotype this block in the ordinary way. I use diffused light to produce the block from half-tone negatives, as in that case the light in the parts that represent the whites creeps around the lines, thus obliterating them in that part, and leaving them strongest only in the parts printing dark. I sometimes adopt another method. I take a negative of the network by transmitted light, and copy this together with the negative, thus producing a positive with the lines already thereon, from which I proceed to make a relief as stated.

To accomplish the second part of my invention I proceed as follows:—In place of using a thin film of collodion (as is generally used in the process called "Woodburytype") to hold the gelatine of the relief I proceed as follows:—I first rub over a sheet of plate glass with French chalk or ox-gall, and then coat with the bichromatised gelatine solution as now used. When this is dried and ready for use I expose the side that was next to the glass for a few seconds to daylight before exposing it under the negative. This has the effect of causing a thin film of the gelatine to become insoluble, which after subsequent exposure under the negative will not wash away but form a support for the photographic image afterwards impressed, thus doing away with the expense and trouble of the double coatings as now practised. When the gelatine relief is dried in the ordinary way I take a thin sheet of tinfoil (same size as the gelatine relief), and attach it by gum or other adhesive substance round the edges to the gelatine relief. I now lay on the back of this a stout sheet of plate paper, and pass the whole through an ordinary rolling-press. The tinfoil is by this means impressed into all the details of the relief; but in that state it would be useless to print from. I then proceed as follows:—A shallow metal box is filled with a composition of shellac and asphalte, which, on warming, becomes soft, but hardens on cooling. This box is placed on a hot plate until the composition it contains softens; it is then placed on the lower plate of the ordinary Woodbury printing press, the foil and relief laid on it, the press closed, and the pressure applied by the under screw. When the composition has hardened the tinfoil adheres to it. I remove the gelatine relief from the foil, and use the foil-backed mould to print from. In place of fixing the proofs by alum or other substance of a like nature I varnish the proofs with an ordinary varnish composed of shellac and alcohol, which gives the print the effect of a photograph on albumenised paper, at the same time protecting the surface from moisture. I also sometimes use the composition melted in boxes without the foil as a printing mould direct, and when sufficient numbers have been printed the box holding the composition is again heated, and can be used over and over again.

The third part of my invention consists in an improved method of printing "Woodburytype" by machinery. This I accomplish as follows:—Out of a solid block of iron I have turned a cylindrical hole, in which is made to fit very loosely a cylinder of soft metal having a taper or conical hole through it lengthwise. Between the interior of the steel block and the soft metal cylinder I insert the gelatine reliefs; then, by means of a taper or wedge-shaped spindle (roughened), I drive by hammering or by pressure the soft metal against the iron cylinder, thus impressing the relief on the outside of the metal cylinder, the taper spindle at the same time forming a shaft for the cylinder to be used in the process of printing. I then mount this roller bearing the relief in vertical slots in a frame having a bed of plate glass on which the paper rests, the roller resting on the glass by its own weight and being dragged round by the paper itself; or in place of the glass plate I allow the soft metal cylinder to lie on another fixed or movable roller of metal or glass. The latter may be hollow so as to reduce its temperature in hot weather by a stream of cold water running through it.

Although the foregoing specification is not quite new, there can be no doubt as to its suggestiveness and value at the present time.

In the course of some recent experiments with ammonio-nitrate of silver we encountered a rather curious experience which we are at a loss to explain, though possibly some of our readers may be able to throw light upon the matter. Having met with a difficulty in evaporating a solution of the double salt without decomposition from disengagement of a portion of the ammonia and consequent deposition of oxide of silver, we endeavoured to obtain the crystals by exposing a concentrated solution to the desiccating action of sulphuric acid under a bell glass. Accordingly two porcelain capsules—one containing the ammonio-nitrate solution, the other strong sulphuric acid—were placed under a bell glass and left for several days. At the end of that time the solution had become much discoloured from the formation of a dirty deposit, presumably of oxide of silver, together with a quantity of small crystals of the same colour. At a little distance above the level of the solution, however, a ring of efflorescent matter had formed on the sides of the capsule of a snowy white appearance, and on the side nearest to the sulphuric acid this white formation extended right up to the edge of the capsule, as if a portion of the contents had been poured out at that point. This, however, could not possibly have occurred, as the bell glass had never been removed during the interval. Upon the upper edge of the other capsule (which was about half-an-inch distant), and immediately opposite the nearest portion of the one containing the silver, a thick incrustation of the same white substance was found; it formed a sort of crown upon the extreme edge of the vessel, and did not extend downwards to the surface of the acid. We at first supposed it to consist of sulphate of ammonia, but upon second thoughts that appeared scarcely possible. Upon testing it was found to consist, as far as our means of analysis enabled us to judge, of *pure nitrate of silver;* it was neutral to test paper, and certainly contained no sulphuric acid. We could readily understand the possibility of the combined ammonia going over to the sulphuric acid, but how had the silver nitrate passed from one capsule to the other and across the intervening space? Is it possible for a salt of silver in the presence of or in combination with ammonia to assume the form of vapour? or does the ammonia in combination with aqueous vapour act as the vehicle for removing the silver in a state of minute division or possible solution?

NOTES ON PHOTOGRAPHIC SUBJECTS.

Sensitiveness of Silver Haloids.—It has seemed to me that in all cases silver bromide gained in sensitiveness by being placed in contact with silver iodide. This conviction was expressed by me in your columns two or three years ago. It seems to make its way but slowly, and yet I am confident that the opinion is correct. Recently I have had a proof of the high sensitiveness that can be given even to negative paper by the use of all three of the silver haloids, the chloride being added to increase the clearness, not, of course, the sensitiveness.

Some paper was soaked in a solution of alkaline bromide, iodide, and chloride, was blotted off well, and then immersed in a twenty-grain bath of silver nitrate, acidulated with a drop of nitric acid, sp. gr. 1·28, to each ounce. It was then washed for over an hour in running water not wholly free from chlorides. This acid bath, long washing, and the presence of chlorides in the wash water tended, of course, to reduce the sensitiveness, yet this was so great as to afford the following proof:—The paper was placed under a negative, and was exposed for one second at a window to a clear blue sky, with a total absence of cloud to reflect light, at nine a.m. in March. The paper was so completely over-exposed that it developed on the back nearly as strong an image as on the front. I conclude that a quarter of a second, or less, would have been right. The light was certainly not one-tenth as strong as direct sunlight, therefore one-fortieth of a second of sunshine would have been sufficient. This indicates a high degree of sensitiveness for paper, especially as it was intentionally placed under certain disadvantages. Besides those already mentioned of an acid bath, long washing, &c., this paper had no accelerating substance such as should always be used when high sensitiveness is an object. Had the alkaline haloids, instead of being dissolved in water, been dissolved and used in an infusion of *cocculus indicus* (which is what I have found best for the purpose), the exposure might have been reduced one-half.

The haloids used were—

Potassium bromide	8 grains,
Potassium iodide	2 „
Ammonium chloride	1½ grain,

to the ounce of water. The same proportions answer very well for collodion emulsions, and might very likely for gelatine.

Carbon Prints.—Dr. van Monckhoven's remarks on carbon printing constitute the most important contribution made to that subject for a long time. There can be no doubt that he is correct in his view that in bichromate printing the chromic acid is not reduced immediately to chromic oxide. There exist three or four compounds between chromic acid (or anhydride) and chromic oxide whose exact constitution is perhaps not definitely settled; they resemble each other in this—that they are brown in colour and insoluble in water. Doubtless they constitute the intermediate step between the acid and the green oxide under reduction by light. These brown oxides of chromium, or chromates of chromium, are capable, of course, of further reduction, and the reduction goes on, as I have noticed, spontaneously and in the dark, even after everything soluble is washed out of the paper, though this takes place but very slowly. I have a collection of prints of ferns and dried plants made about forty years ago, soon after Mr. Ponton first published his discovery, by exposing under them letter paper soaked in bichromate solution and dried—after exposure simply washed in water. Shortly after these prints were made they were bound into a volume, and this volume was kept rolled in thick paper and in a dark drawer. Nevertheless, in a few years the ground changed from a rich dark brown to dark green; it was then permanent, and has so remained ever since.

The method proposed by Dr. van Monckhoven of converting the brown oxide formed into the green by sodium bisulphite is, of course, correct in principle. It is probable that sodium hyposulphite would answer equally well. The substitution of iron oxide as a colouring matter is also a step in the right direction. There is no known colouring substance equal in permanency to ferric oxide. The drawings in red crayon made three and a-half centuries ago by the artists of the renaissance period are as bright as if made today. The suggestion to substitute ferric citrate in the print and to apply the bichromate afterwards is most ingenious.

For this purpose I would, however, suggest that ammonia-ferric oxalate might give far better results than ferric citrate. In 1873-1875 I made hundreds, I might almost say thousands, of experiments with the iron salts; and though this work was with quite different objects from those that Dr. van Monckhoven has pursued, I think I can say that the oxalate would be found preferable to the citrate. Dr. van Monckhoven is much to be praised for not fettering these valuable novelties with patents.

Architectural Perspective.—In the discussion on this subject, reported in The British Journal of Photography for March 22nd, some of the opinions offered seem to overlook the fact that in observing either a photograph or a perspective drawing of an architectural subject the eye is not supposed to be opposite the centre of the drawing, as in observing a portrait. In the former case the photograph or drawing is supposed to be held up vertically in front of the observer, whose eye is opposite to, and on a level with, the horizon line. In all views of architectural subjects the horizon line is placed below the middle of the picture, and in views (or drawings) of high buildings very much below. Therefore, when the view is held up vertically in front of the observer, with his eye opposite the horizon line, the upper part of a high building *is much farther from the eye* than the lower, and, therefore, when (correctly) made of equal breadth the upper part subtends a materially smaller angle at the eye than the lower. In both these particulars, viz., greater distance and subtending a smaller angle, the representation corresponds with the object itself. This is, perhaps, the simplest explanation of the fact that vertical lines in nature must be rendered by vertical lines in every correct representation—photograph, drawing, or painting.

Gallic Acid in the Oxalate Development.—Next week I shall have some further remarks to contribute on the employment of gallic acid, the usefulness of which becomes more apparent with every trial.

M. Carey Lea.

THE VOLUMETRIC ESTIMATION OF THE STRENGTH OF SOLUTIONS OF SILVER NITRATE, AND THE RECOVERY OF SILVER FROM WASTES.*

In the short time at my disposal I shall only be enabled to give you an outline of a process for the recovery of silver from wastes.

There are two general methods of dealing with this subject, namely, the dry and wet processes. The one I wish to bring before you is the wet process, which I have found in many respects to have an advantage over the dry.

We will suppose that you have a solution containing silver nitrate—say an old bath, or any other kind of liquid waste. The best thing to precipitate it is hydrochloric acid, or you can use common salt. It will be well not to add too much of either of these substances. It can be easily ascertained when the proper

* Concluded from page 174.

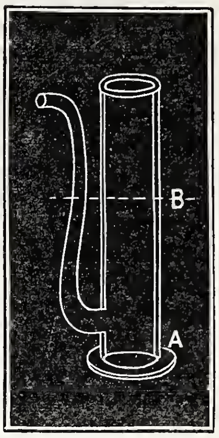
quantity has been put in. Use a large glass beaker, and in adding the precipitant let it mix thoroughly with the waste. The silver will quickly combine with the chlorine and form silver chloride. This reaction is represented thus:—

$$Ag\,NO_3 + H\,Cl = Ag\,Cl + H\,NO_3.$$

Or with common salt—

$$Ag\,NO_3 + Na\,Cl = Na\,NO_3 + Ag\,Cl.$$

If the quantity be small it can easily be perceived when enough of the precipitant has been added by its no longer affecting the solution. It frequently happens when the solution is contaminated with many impurities, or when large quantities are operated upon, that it is best to have recourse to an ingenious contrivance known as "Beal's quick filter," which is a small cylinder about three inches long, with a spout out of the bottom end (or you can use a test tube that has the bottom end broken off). By tying a piece of filter paper over the end A and immersing it in the liquid—say as far as B—the liquid will filter through and can then be transferred to a small test tube. If one drop of hydrochloric acid be put into it and no precipitate be obtained sufficient has been added, and it must be left for some little time to settle. If possible now pour the liquid on to a filter, leaving the chloride behind in the beaker. The filter will retain any that might be floating about. No precipitate separates more readily than Ag Cl, and it can very easily be washed. Repeat this washing until the last washing water is neutral to test paper, and now drain off all the water. Then to every three and a-half ounces of the chloride so obtained add at once one ounce of caustic soda and a quarter of an ounce of lump sugar. Now add a little water and boil, stirring it constantly; it will be found that the silver has been reduced to the metallic state in a fine greyish-black powder. This result is brought about by the joint action of the sugar and caustic soda upon the silver chloride.



After thoroughly washing the silver precipitate drain off the water and add pure nitric acid until it is all dissolved; then evaporate it to dryness, add distilled water, and evaporate to dryness again. What is now left is lunar caustic, or, as it is known to photographers, fused nitrate of silver—the best possible form of silver nitrate of which to make a bath. Weigh it, and make a solution of (say) one hundred grains per ounce of distilled water, keeping it so as to use for either paper or silver bath. Bath solutions can now be made up without the trouble of weighing; you need simply measure the quantity of your one-hundred-grain solution that will give the proper strength. I have done so, and found the negative bath so made to work immediately it is mixed, and to give the best possible results.

It may occur to some one that other chlorides might be thrown down and militate against the ultimate purity of the result. This is possible only in the case of lead or mercury, as silver, lead, and mercury are the only elements that give insoluble chlorides as far as water is concerned. It can easily be ascertained if these are present in the washed chloride by taking a small portion and boiling it with distilled water in a test tube, and filter while hot. To the filtrate add a little sulphuric acid; if there be no precipitate lead is not present. Now pour over the portion left on the filter paper a little strong ammonia, warm; if mercury be present it will be blackened, and the ammonia will take up the silver, leaving the mercury behind on the filter paper.

On examining these reactions it will be found that lead chloride is soluble in hot water, and the other two are not; also that silver chloride is dissolved by ammonia, mercurous chloride remaining undissolved, but being blackened by this reagent, a method of separation being thus easily formed. JOHN GARBUTT.

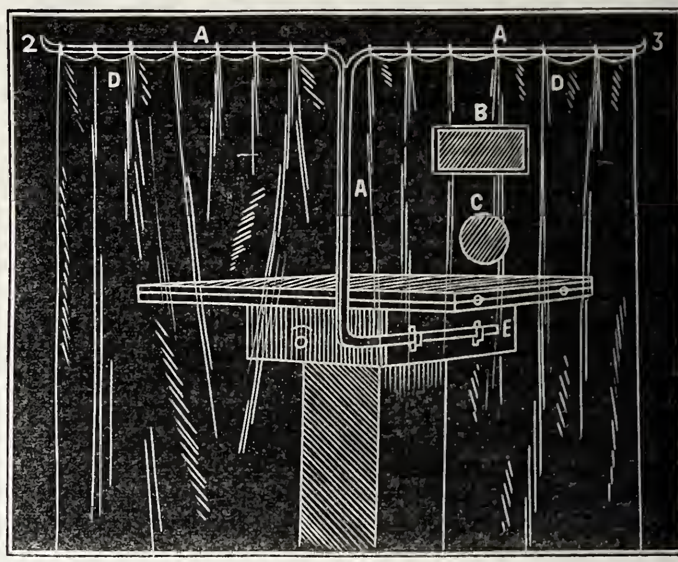
OUR APPARATUS.

No. III.

SCREENS AND CURTAINS.

SOME persons have a great antipathy to be looked at during an exposure, and invariably protest against it; but as the operator will gain considerable advantage if he does watch his sitter carefully, these conflicting wishes must be compromised if possible. By keeping a watchful eye on the sitter a sharp picture may more often be secured than if such surveillance is neglected. This is especially the case with children, who need the most careful, unostentatious watching to obtain a fairly successful picture. A natural expression is the *sine quâ non* of a good portrait of a child. The cross, formal, or constrained expression usually seen must not be laid to the fault of the child, who is often very shy and uncomfortable with such unusual surroundings as a photographic *atelier* and its accessories; but more to the fault of the operator, who fails to use the means he has to the best advantage. But I am digressing.

There is much advantage gained if the operator remain out of sight during exposure, and to effect this nothing is better than a curtain attached to a light iron rod, bent twice as in the diagram,



A A A, iron rod attached by sockets to front of camera stand; B, yellow glass window; C, hole in curtain for lens to look through; D, curtain; E, short arm fitted into sockets.

and attached to the front of the camera stand, which is sufficiently large to hide both operator and apparatus from view. A hole is made to allow the lens an uninterrupted view of the sitter, and a small yellow or blue glass window three or four inches square for the operator to obtain his view, the coloured glass preventing observation in return. The short arm E in diagram fits into sockets in front of the framework supporting the table, the upright portion of the bend 2 is sufficiently long to hide the head of the operator, and 3 is the arm to which a curtain reaching nearly to the ground is attached. As it can be either used or not as may be required, it is, I can say from experience, an exceedingly useful screen. Those used for reflectors I have found more useful and manageable if *not* attached to stands. A light frame covered with white glazed calico can be placed anywhere, and takes up little room when not in use. Not having, however, tried the more elaborate arrangements, I can say nothing for their superior convenience. The light detached screens answer every purpose, and for efficiency and economy I scarcely think will be superseded.

With regard to curtains for modifying the light: much depends on the quantity and quality of light peculiar to the studio, as in this respect most differ. Use can be found for white muslin curtains in almost every glass room. As far as actual use is concerned, black, opaque, and white blinds are all that are required for this purpose; but, owing to the gloomy and funereal appearance of black, good stout green ones are usually substituted as less likely to give a false impression of shade than any other colour. All curtains should be frequently shaken, to dislodge the dust, which is very apt to accumulate and become a nuisance, and, to those who take a pride in the neat appearance of their glass rooms, also an eyesore.

LENSES.

With respect to this very important portion of our apparatus, the difficulty is how to choose amongst so many good ones. Where expense is no object lenses of every form may be part of the stock, and be found useful; but with the majority of photographers half-a-dozen form the assortment from which to choose. Good pictures may be obtained with almost any, if good of their kind. Two qualities are needful for almost all purposes, *i.e.*, crispness or definition of the image, and that the visual and chemical foci shall be coincident. Whether it shall include a large or small angle depends on the purpose for which it is required.

For portraiture in the studio we are limited to a kind that will admit as much light as possible, and act rapidly, but for outdoor work almost all kinds *can* be used. Many eminent photographers prefer the single lens for ordinary landscape work as giving a brighter picture than the compound form. I must, for my own part, confess a partiality for a good medium-angle doublet for landscape or architectural subjects, using a larger lens than is generally considered necessary and working with the largest aperture—say a 12 × 10 lens for an 8 × 6 picture. This plan ensures absolute sharpness over the whole field, straight lines in architectural subjects, and no deficiency of atmosphere, which is often induced by stopping the lens down to ensure sharpness to the edges of a plate of the size the lens is advertised to cover. I, however, merely state my preference, under the impression that I have obtained better photographs when working in this way; but, as I have already said, the lens must be adapted to the subject, and no hard and fast rule can be laid down.

With regard to the storage of lenses: they should be carefully kept in a dry place. Photographic premises are, unfortunately, frequently damp, necessitating much care in this respect. A suitable cupboard or box lined with baize may be devoted to them at home, containing divisions for each lens; and as they of all our apparatus contain the most value in the least space, it is as well to keep them under lock and key when not in use. A sling case is very convenient for carrying them when engaged in outdoor work. The glasses should be carefully wiped with a soft silk handkerchief before use. Never set to work in a warm atmosphere directly after removal from a colder one without gently warming them first, or they will in all probability condense moisture on their surfaces and cause some trouble. This is particularly the case in cold spring months. The mounts also get corroded and unsightly if they are put away in a damp state. Judging by the number of dilapidated-looking lens mounts one sees in use this oversight must be of very frequent occurrence.

If lenses are removed from their mounts for any purpose care must be taken to replace them in their original order, and no force should be used in screwing them together; for if the screws are accurately placed with regard to each other no force is required, and if it be used it will be to the damage of the thread. A little of this injudicious screwing every time a lens is taken to pieces and put together again will soon render the screws useless. If delicate, uninjured screws, such as those attached to our instruments, refuse to work easily, it is an invariable fact that they are wrongly adjusted with regard to each other, and the use of force is a sure way to spoil them. A little knack and gentle treatment will manage a screw that would defy the power of an athlete to turn if set wrong at the commencement.

Metal caps are seldom seen now on modern lenses, the leather and velvet entirely superseding them. Any photographer using the old-fashioned metal ones would do well to discard them for the lighter and easier-fitting make. In the earlier days of photography a ricketty stand and tight-fitting metal cap were a very usual combination of troubles, and even now they occasionally may be found with the village photographer or the less successful town practitioner, whose stock-in-trade consists of a second-hand French combination lens, or maybe with the young amateur, who has had no experience as to the advantages or disadvantages of one kind or the other.

Pneumatic Holders

are, preferably, those consisting of an india-rubber ball enclosed in a case, communicating with an india-rubber disc to support the plate. This form is easily manipulated with one hand, and less liable to get out of order than other kinds; if it do it is more easily repaired. A little strong solution of rubber poured round the screw in the disc will usually set all right, for this is the place where in all probability it will give way first. Lever and half-screw holders are more or less troublesome and continually getting out of order, besides being of a more expensive make. For development the gridiron form of holder is, to my thinking, most convenient. It consists of a stout wire, bent like the frame of a gridiron, the bars of which are supplied by india-rubber bands placed at right angles to each other, forming a sort of lattice upon which the plate to be developed securely rests, with a handle at one corner. This form was described at the last technical meeting of the South London Photographic Society. It allows the plate to be easily manipulated, and keeps the hands clean. E. Dunmore.

NOTES FROM THE NORTH.

The lapse of Swan's patent for the manufacture of pigment tissue will doubtless give an impetus to carbon printing, bringing it into more general use, and probably leading to many improvements both in the *modus operandi* and in the finished result. I do not, of course, mean to imply that the company who have hitherto held the patent acted in anything like an illiberal spirit, as I believe it is mainly to the zeal and business tact which they brought to bear on it that carbon printing has attained its present satisfactory position; but there are many who have such an inveterate dislike to patents—especially patents connected with photography—that they will have nothing to do with them, however liberal the terms may be. But now that the manufacture of tissue is open to all, and with the exquisite results got by single transfer, I have no doubt the ranks of successful carbon printers will be largely increased.

I am glad to say that Scotland is likely to take a fair share of the work, and have pleasure in publishing a few notes of a late visit to the carbon printing establishment of Mr. Annan, of Glasgow, recently erected at Lenzie. I dare say most of my readers will remember an account of the establishment of Messrs. G. W. Wilson and Co., of Aberdeen, which I wrote about a year ago; and as the process and apparatus of Mr. Annan are very similar to those of Messrs. Wilson and Co., I need not take up space in repeating those details.

Lenzie is a village some six or eight miles to the east of Glasgow, and from the absence of smoke and freedom from fog, &c., is better suited for such work than the smoky city. With a view to future expansion Mr. Annan wisely resolved to secure a large plot of land, and this he fortunately found in the shape of a garden attached to a somewhat antiquated dwelling-house. Here he proceeded to erect buildings large enough for present purposes, but in such a way that necessary additions can be made from time to time as the exigencies of business may require. The establishment, as at present in full operation, stands on a pretty high elevation about five minutes' walk from Lenzie station. On entering the gate leading from the public road one sees in front a large two-story building in the form of the letter L, and on the right the dwelling-house already mentioned. Fortunately I found Mr. Annan at home, and received the genial welcome so generally given and received amongst the photographic fraternity, and to my request to be shown over the premises he at once gave a hearty acquiescence and tendered his services as guide and instructor. We first visited the old dwelling-house, thus commencing at the end rather than at the beginning, as the first room we entered was that devoted to mounting, rolling, &c., and in which we saw a rolling-press made by Messrs. Greig, of Edinburgh, more like a huge mangle than anything for photographic purposes. Two other rooms on the ground floor were devoted to enlarging purposes, the one being the dark room and the other the camera. The latter we did not examine particularly, as there was a plate being exposed, and we could not turn on the gas in consequence; but the arrangements generally are very much like those I described as having been seen at Aberdeen. Some idea of the exposures, however, may be obtained from the fact that the operator had gone to dinner, leaving the work to proceed during his absence. The floor above was devoted to the manufacture of tissue, one room being used for the mixing of gelatine and pigments, another devoted to coating, and two others to drying, the temperature being kept at a suitable degree by a stove and plenty of piping. This, I may say, was the only part in which the arrangements seemed to me to be defective, as I believe that the quality of the tissue is influenced by the temperature, and think the drying-rooms should be so arranged that a current of dry air at any desired degree of temperature may easily be sent through them.

Much has been written regarding the necessity for permanency in the coloured pigments used to warm the carbon, and that Mr. Annan is fully alive to such necessity may be known from the fact that I saw a series of reds and browns which had been exposed to light for months before they were admitted into the list of those suitable for the purpose.

The machine for coating the tissue is extremely simple, and, so far as I can learn, has not been improved upon since its invention by Mr. Swan, of Newcastle-on-Tyne—indeed the one in ordinary use by Mr. Annan is the identical machine the inventor employed; but, as I am not quite certain that I got permission to describe it, I shall postpone a description of it till a future occasion, when I may be allowed to furnish a drawing of the machine. I may, however, say that it is so simple that an amateur desiring to coat small bands of tissue for his own use might easily construct one for himself at a trifling cost.

Crossing the well-kept grounds we come to the building described as erected in the form of the letter L. The lower part of the longer portion of this is devoted to printing. The tables, running on rails, may be brought into the open air, kept under glass, or run quite under the upper floor, where the frames are filled and emptied. The lower part of the shorter portion is the developing-room, and contains seven tanks or trays, two of them measuring seven by five feet each. Here also is a boiler for the supply of cold water, both that and hot being laid on to each tank. "What do you mean by a large picture?" is frequently asked, and I suppose the answer must always be a somewhat negative one; but here I saw what most photographers would admit was a large negative, being a copy of a picture on a plate seven feet by three and a-half feet.

The floor above the printing-room is a large glass house glazed on the top and both sides, and fitted throughout with louvre boards. This is used for copying purposes, and contains an enormous camera on rails, with a triplet of some eight inches diameter. The camera was not, as in ordinary circumstances, pointed to the picture about to be copied, but turned so as to look out at the side of the house; and on the lens was placed a kind of cap carrying a plate of silvered glass, so as to give a reversed negative. A door leading out of the studio gave entrance to another laboratory and enlarging-room, both of which were in constant use.

In a long and pleasant chat with Mr. Annan I learned that they were doing a large amount of work for the trade, but he did not, on the whole, consider that a satisfactory branch of the business. Many of the negatives sent were poor and not well adapted for enlarging, while some of those who sent them seemed to expect results quite equal to that of the best-selected specimens. Work for the "trade" must, however, be always a trifling matter compared with the expensiveness of other branches, and an examination of the work in progress of even such a young establishment as that of which I am writing shows, with tolerable certainty, the line in which profitable employment is to be found.

In reply to a question as to the work actually in hand, Mr. Annan, with his well-known characteristic modesty, said they had "a few little jobs;" and taking me over to his private residence—a portion of which, for lack of room elsewhere, had been converted for the nonce into a packing-room—showed me a finished set of 13,000 prints from one hundred negatives, for a second edition of a book about to be published in Glasgow. Another order in the course of execution consisted of 3,000 prints from thirty negatives of the old closes and other interesting portions of Glasgow now removed by the Improvement Trust to make way for more modern erections. A third order consisted of copying four pictures by Herdman, for reproduction in carbon for the Glasgow Art Union, 2000 copies being ordered to begin with.

Altogether Mr. Annan's establishment gives a fair idea of the importance of carbon printing, and I shall rejoice to hear that there are many such both here and in England, as I believe that, at the present time at least, the ordinary course of cause and effect will be reversed, and that the supply will produce the demand.

While carbon printing is thus brisk in some quarters there is still heard the general complaint that photographic business is dull; but it would seem that there are those who think Edinburgh an exception to the rule. For some years the impression has been that of professional photographers we have had "enough and to spare;" but they will require to "put their best foot foremost" if they wish to retain anything like a premier position, as, if report is to be credited, their numbers are to be considerably increased by some well-known men from various parts of the country. Between this and the Whitsuntide term I understand that Mr. Marshall Wane, from the Isle of Man, Mr. Mackenzie, from Paisley, Messrs. Taylor Brothers, of London, and Mr. Thompson, of Kirkcaldy, will throw in their lot amongst us. I hope they will all succeed as well as they can wish, and have no doubt they will get a hearty welcome from their professional brethren, the only rivalry being as to who shall turn out the best work.

The exhibition of the Royal Scottish Academy is now in full swing, and is well worth a visit by all who have an interest in art, and especially of all interested in photography. To the thoughtful photographer such a visit will forcibly suggest two things—first, the great influence that photography has exercised on art; and, second, the great benefit that art may confer on photography. That artists—or at least very many of them—turn up their noses at photography is, for them, a sad fact; but it is, nevertheless, true that a careful study of a majority of even the best pictures on the walls will show that the artists have been more indebted to the art which they affect to despise than they would care to acknowledge; while, on the other hand, the photographer who will carefully examine the composition and method of treatment adopted by the leading painters of the day, and will apply the knowledge thus gained to his work during the approaching season, will, I am quite certain, have no cause to regret his visit to the exhibition.

Does anybody want a hint of something new, and that would be sure to take? Here it is—in the form of a lamp shade I saw in the house of an amateur friend a few days ago. The shade was one of the conical cardboard kind, both cheap and pretty, and which, when laid over the ordinary lamp globe, throws the light down on the table, and is really ornamental. Around the shade at equal distances there were ovals cut out and filled up with silver prints which had been made semi-transparent by paraffine, and when in use the effect was charming. Photographers who adorn their reception-rooms with frames and photographic knick-knacks generally should try something of this sort, and I am persuaded that there would be little difficulty, when taking orders for *carte* and cabinet pictures, to get a commission for a few such shades with portraits of the various members of the family inserted in the openings. If the manufacturers of mounts, &c., are not above taking a hint, I would suggest the propriety of their getting up such shades with the ovals cut out ready for the pictures. The inside should, of course, be white, and the outside of any tint they like; but secondary colours are more chaste and in better taste than primaries. A narrow band of gold might be put at the top and bottom and also round the oval. Of course the price charged for these articles would depend on the work put upon the shades; but I know that a really beautiful article could be produced for a few shillings per dozen. Who will be first in the field, and not only make a good thing for himself but help others to do likewise?

JOHN NICOL, Ph.D.

WASHED FILMS.

In November, 1869, I published an article in the *Photographisches Archiv*, in which I stated that silvered and washed albumenised paper remained white for a long period, and when fumed with ammonia that it gave good prints. The idea made a considerable noise at the time, but it has not been adopted in practice, though scarcely anyone will deny that the process is a good one if it be completely carried out. I, myself, latterly gave up the practice of fuming with ammonia, and substituted a second silver bath having about five per cent. of the nitrate, and by this process, with the exception of a few waste sheets at the commencement, obtained results satisfactory in every respect.

To many it may appear a useless operation, first to wash the paper after having been silvered, and then to silver it again. But one should remember that in washing the silver the nitrate salt will be washed out, which always forms during the sensitising of the paper, and not only appears to be the cause of the rapid deterioration of prepared paper, but also interferes with its sensitiveness and toning.

A short recapitulation of the process may not be out of place here:—On the first (eight per cent.) silver bath the paper should not float longer than is required to change the chlorine salt into chloride of silver, and the albumen into albuminate. The time will vary, with the sort of paper, from twenty-five to forty seconds. I use Höffert's (of Dresden) ten kilo double albumenised paper, and silver exactly thirty seconds. If the paper roll up on the bath then it is too dry. After being silvered the paper should immediately be washed four or five times in clean distilled water, laid between blotting-paper, and finally, while still wet, placed on the second bath. Here, if it float twenty seconds, it will be found sufficient. If one be willing to put up with the loss of a few trial pieces, it is most convenient to dry the second time also between so-called chemically-clean filtering paper; but it is to be feared that occasionally the chemical purity of the paper will be ocularly demonstrated in the form of very annoying spots of reduced silver. The paper improves with constant use.

There remains but one thing more to mention, namely, that I add to the silver bath about five per cent. of alcohol, and to the last washing water, before toning, a little common salt; and that I always fix in a fresh five-per-cent. soda bath. I am seldom troubled with blisters, and it appears to me that they only make their appearance when the paper has been too long silvered.

What has been said of the paper really applies also to the negative process. If it be wished to retain the greatest possible degree of sensitiveness got by the silver bath for the longest possible time the bath is iodised by adding a solution of iodine in alcohol without further acidification; and in the same bath the same collodion is always used, and, if one prepare it oneself, only such as supplies the bath with a single base, and through that with but one nitric salt. Almost all collodions contain the iodine combined with two, and some with even three, different bases; it is only occasionally that we come across one in which only a single base is prescribed (Vogel's bromo-iodised cadmium collodion), and these last base their claim to general use on the fact that only one nitrate is produced in the bath, and thus they retain their sensitiveness longest. Some photographers use in the same bath any collodion that may be at hand, or which may be best suited for some special purpose; they, however, do not think, or do not know, that with every new collodion they add a few new salts, or double salts, to the silver bath, which by no means increase its sensitiveness. But in order to get the greatest possible sensitiveness and fineness with one collodion and silver bath it is necessary to wash out the nitric bases.

Carefully-cleaned and polished plate glass, without any coating of albumen, being used for the picture support, wash the sensitised plate in pure distilled water to which about one per cent. of nitrate of silver had been previously added, and which had been sunned for some hours. If this purifying of the water be omitted, and the water be not perfectly clean, the plates blacken under the developer. The washing is best done in a large dipping vessel, in which the plate, laid upon the dipper, may be moved up and down and backwards and forwards until the water runs smoothly off. Now let the plate drip, and then place it in a third dipping-bath containing a five- or six-per-cent. silver solution saturated with iodide of silver and slightly acidulated with pure nitric acid. The iodising is here most simply accomplished by leaving the previously-washed plate for a long time in the bath; but the acidification should only be done with so-called pure nitric acid from which the cloudiness caused by its addition to the nitrate of silver solution has been removed. In this last bath the plate should remain at least one minute. From the rather powerful fresh developer the alcohol is best left out altogether, and for its acidification I prefer sulphuric acid to the organic acetic acid (Vogel).

The washing of negative wet plates, in order to be able to keep them longer before developing, is not new. In 1869 Mr. Jabez Hughes, of

Ryde (as stated in the *Archiv*), thought so highly of the process that in summer he used it for studio work. However, by his plan the principal advantages of increased sensitiveness and fineness of the negative are lost by washing the plates with distilled water purified, or rather dirtied, with potassic permanganate, and, before developing, the plate is brought back into the original silver bath, which is impregnated with nitric acid, in order to supply it with the necessary silver. THEODOR BADEN.
—*Photographische Correspondenz.*

ON THINGS IN GENERAL.

IN connection with art and art canons there has been much loose writing and talk lately. Naturally I do not class every photographer alike. There have been (alas! poor Rejlander!) and are men of large culture and artistic feeling, but they only show by contrast the shortcomings of the rest. Thus we had recently a paper, by Mr. Payne Jennings, on taste in landscape composition, showing a considerable amount of true artistic insight; but it is very evident that his Nos. 1 and 2 photographers form a large majority, and his No. 3 is almost a *lusus naturæ*. Imagine his No. 2 man reading of Mr. Jennings' imaginary artist dealing with atmosphere in the manner indicated, taking a view in a hazy morning with a lot of smoke tumbling out of a chimney! Even Mr. Jennings will admit that this was very accommodating smoke. My experience of smoke early on a hazy morning is, that it too often hangs about the premises in a manner that would make a photographer as suspicious as a policeman of a man "without visible means of employment;" yet my knowledge has not been obtained by the experience gained from my bedroom window over the housetops.

A great deal has been said about the higher education of photographers and the establishment of some kind of a college giving certificates of competency in photography, and the question arises whether with the rudimentary acquaintance with anything but manipulation—matters which could be learnt by a child in half-an-hour—such an institution might not be productive of great good. On the other side, here we have Mr. Hance suggesting, in effect, that they should first be taught to write and to spell. What unconscious sarcasm!

Dr. Monckhoven's paper seems to have fallen like a bombshell into the middle of a calm, placid sheet of water, and the waves and wavelets have not yet subsided. I feel sure his communication will be the means of great good. It will teach us all to think more about what we do and what we use, and not accept too blindly tradition or present practice as being established facts beyond cavil or discussion; for, be the verdict what it may about the permanency or non-permanency of pigment pictures, there are few photographers who are not now a great deal more competent than they were to pass an opinion on the subject. But it is useless to shut our eyes to the fact that, though now it is possible to produce unalterable pictures, there yet are many pictures produced which will fade into very wretched-looking things after a few years' trial. Further: the present advanced state of really trustworthy pictures has been built upon experiments made at the public expense, for there must be thousands of pictures in existence at the present day in which have been used, to modify the tone, not only cochineal colours but magenta dye. No one can deny that these will fade. I am thoroughly of opinion that all the tissue now sent out by the Autotype Company as permanent can be utterly relied on.

We have not had much process-mongering of late. I wonder whether the something I read the other day was the first symptoms of the exploitation of "a new and valuable process." Some one in France has discovered a new "instantaneous process" which was not to be divulged till a number of *savants* had passed judgment upon it. Last Sunday they were to meet, and a crowd was expected in a Parisian studio. We shall see what we shall see.

Among the new things I have jotted down is a very strong statement that daguerreotypes will not fade when exposed to the air, and that, indeed, they form the most permanent of all kinds of photographic work.

I have also seen recommended that a picture to be photographed should be covered with a layer of soap and then washed off, and finally rubbed over with olive oil, followed by a quick-drying varnish. What a delightful state the picture would be in if the apparent intention of these instructions were followed, and how pleased its owner would be when he saw the effect! The mixture of olive oil and varnish so naïvely suggested is too rich! FREE LANCE.

Our Editorial Table.

THE PSYCHOLOGICAL REVIEW.
London: E. W. ALLEN.

THE public is not supposed to know it, but we happen to be aware that this new quarterly is brought out under the editorial supervision of Mr. William White—a name well and favourably known to the readers of our ALMANAC, as well as to every one who takes an interest in the new processes of producing sodium and magnesium. The editor has gathered round him a host of contributors who are recognised in the psychological world as being clear thinkers and facile writers; and it is scarcely necessary to say that under the supervision of an accomplished *litterateur* like Mr. White, who himself contributes an important article *On the Ethics of the New Age*, the new quarterly is in no danger of sinking to the level of commonplace.

INSKIPP'S RAPID DRY PLATES.

MR. INSKIPP has sent us a sample of his rapid dry plates with a request that we should speak of them as we find them. These plates are of excellent quality, possessing a high degree of sensitiveness. The following are the directions given by Mr. Inskipp for developing the image:—

"Flow over the plate a mixture of methylated spirit three parts, water one part (this may be used over and over again); let it soak into the film for a minute, then well wash under the tap or from a jug, and pour over the following developer:—

Common washing soda	1 ounce.
Bromide of ammonia	25 grains.
Strong liquor ammonia	¼ ounce.
Water	10 ounces.

Take enough in the developing cup to cover the plate, flow over two or three times and back into the cup, then with a strip of thin glass, or card about a quarter of an inch wide, take up a little dry pyrogallic acid on the tip, about the bulk of a pea for a half-plate, stir into the developer, and apply again; the image will speedily appear and gradually gain strength. Should the detail be slow in coming out or lack density, add a little more pyro. *As soon as the detail is all out wash off and fix* in weak hypo. After well washing *let it dry.* If not then intense enough moisten it again (with water only this time) and proceed to intensify with the ordinary pyro. and silver intensifier, when any amount of density can easily be obtained."

In a note appended to these directions Mr. Inskipp says:—

"The quantity of dry pyrogallic acid may seem rather indefinite, but considerable latitude is allowable. Increasing the quantity quickens the development and produces density, and *vice versâ*. Except for instantaneous exposures it is better to add it gradually."

Having given the above formula a thorough trial we can recommend it as a good one. In some instances we found it necessary to slightly increase the proportion of bromide of ammonia.

THE UNIVERSITY MAGAZINE.
London: HURST AND BLACKETT.

THE name of the Earl of Rosebery having recently been brought prominently before the public, it is not to be wondered at that the enterprising conductors of *The University Magazine* should have made choice of his lordship as a fit and proper subject for the fourth number of the new series of "Contemporary Portraits." The photograph is from a negative by Messrs. Lombardi and Co., the printing being effected by the Woodburytype process. The articles in this (the April) number are as varied and interesting as usual, Professor Ruskin leading off with an autobiographical reminiscence—*My First Editor.* Mabel Collins, Karl Blind, F. R. Conder, and others contribute articles which are well worthy of thoughtful perusal.

DESIGN AND WORK. VOL. III.
London: PURKESS, 286, Strand.

LIKE the previous volume of this work, which we noticed last year, this contains much that is calculated to be of both use and interest to the mechanic and amateur, especially to the youthful artisan. There are numerous hints on photography scattered through the pages of the work, those which have been selected from contemporary pages being good and reliable. We cannot speak in the same terms of some contributed articles, entitled *Photography for Beginners*, the author of which adopts the unwise policy of recommending, with numerous illustrations, his readers to manufacture for themselves makeshift apparatus, in which single non-achromatic lenses of the spectacle glass family, pasteboard tubes, and other parts *en suite*, are the appliances. It is true, however, that he informs them that a flint concave lens to achromatise the biconvex may be made out of the bottom of a glass tumbler, provided the class for whom he writes these articles (and whom he apparently assumes to be impecunious) are able to do so. In contradistinction to such teaching we would recommend the photographic aspirant to *purchase* a properly-constructed achromatic lens and camera, which, to be effective, need not necessarily be expensive. "Makeshifts" usually prove as expensive in the end as proper appliances, while they are unsatisfactory throughout. It is proper we should add that some of the correspondents of *Design and Work* are also of the opinion we have here expressed.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 25	Liverpool Amateur	Free Library, William Brown-st.
„ 25	Oldham	Hare and Hounds, Yorkshire-st.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held at the Memorial Hall, on Thursday evening, the 11th instant,—Mr. Alfred Brothers, F.R.A.S., President, in the chair.

After the minutes had been read and confirmed,

The Chairman showed some mechanical autotypes representing old and new Manchester, from wet-plate negatives by himself, and also some interiors from wet-plate negatives by Mr. J. Pollitt.

Mr. Schofield exhibited a camera-tripod by Mr. Ross, a wood and glass tray, some prints from Mr. Inskipp's dry plates, and a bromide-of-zinc emulsion transparency developed with Newton's developer.

Mr. Wigglesworth showed some results of his experience with Liverpool dry plates.

Mr. J. W. Leigh introduced a camera-tripod made of bamboo canes, and explained how one of the legs could be utilised as a fishing-rod. This tripod was both light and firm.

Mr. J. Holding again alluded to burnt-in pictures on wood, but nothing new was elicited.

A vote of thanks was passed to the exhibitors, and the meeting was adjourned.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

A regular meeting of this Society was held on Thursday evening, February 21st,—Mr. Joseph W. Bates, Vice-President, in the chair.

The minutes of the previous meeting were read and approved.

At the suggestion of Mr. Browne it was resolved to ask the members to bring lantern slides to the next meeting of the Society, from which a selection could be made for another exhibition.

Mr. Thos. H. McCollin exhibited a new form of manipulator, made of wire, and intended for holding plates while developing.

Mr. Browne raised a question regarding the possibility of photographing a building or view illuminated by a flash of lightning.

The matter was discussed at some length, the general impression seeming to be that such a feat was impossible.

Mr. McCollin laid upon the table a portrait, by Messrs. Broadbent and Taylor, thought to be the first ever made in America by the dynamo-electric light. This picture, which was very successful, had an exposure of one and a-half minute.

Mr. Sartain exhibited the apparatus used by Dr. Goddard and Mr. Cornelius in their early photographic experiments. This collection was examined with great interest by the members, and a vote of thanks given to the exhibitor.

The meeting was then adjourned.

Another meeting of the above Society was held on Thursday, March 7th,—Mr. Ellerslie Wallace, Jun., President, in the chair.

After the minutes of the previous meeting had been read,

Mr. Barrington, on behalf of the committee on excursions, proposed the following route for the spring trip:—The party to start from Philadelphia on May 15th or 22nd, and go by rail to Nanticoke, then take the canal boat for Northumberland, which will occupy about three days. After remaining over Sunday at Northumberland the party will start for Harrisburg on Monday morning, arriving there about Wednesday, thence by rail to Philadelphia.

The proposed route was favourably received by the members, and the committee was requested to give a detailed report at the first meeting in April. A short trip by tugboat was also discussed, and the committee was requested to include this in their report.

Following a motion by Mr. Bates, the Room Committee was authorised to select a room more suitable for the Society in the vicinity of Broad-street and Chestnut-street.

Mr. Browne moved that an exhibition of lantern slides, selected from the work of the members, be arranged.—The motion was carried.

The Chairman appointed Messrs. Browne, Dixon, and McCollin as the committee.

The meeting was then adjourned to permit the members to exhibit the slides intended for the forthcoming exhibition.

PENNSYLVANIA PHOTOGRAPHIC ASSOCIATION.

The usual meeting of this Association was held on February 12th, at the studio of Messrs. Mahan and Keller, 1427, Ridge-avenue, Philadelphia,—Mr. J. C. Steinman, President, in the chair.

The minutes of the previous meeting were read and approved.

The Auditing Committee reported that they found the books of the Treasurer correct. The report was accepted and filed as usual, and the Committee discharged. The balance in hand was $\$62\frac{31}{100}$.

The questions of the last meeting were then read and disposed of. It was asked what was the best toning bath to produce a rich purple colour.

Mr. John R. Clemmons stated that the borax bath was the best, such as he gave at the previous meeting.

Mr. Davis Mahan, of Pittsburg, Pennsylvania, being present, was called on, and said he thought that in his hands the purple tones were best procured with phosphate of soda. He also gave his formula for the paper silver bath as worked successfully by him for several years, viz., using glycerine about one ounce to ten ounces of bath; but he varied it a little, as some albumenised papers required less, and others more, than the above. In drying it left the paper soft and pliable, and entirely overcame the cracking of the albumen, as was so often the case with heavily-albumenised papers. It toned with less gold and with great brilliancy, and obviated the use of soap or anything else in burnishing.

The thanks of the meeting were tendered to Mr. Mahan.

The meeting was then adjourned.

Another meeting of the above Association was held on the evening of March 12th, at the studio of Messrs. Mahan and Keller, 1427, Ridge-avenue,—Mr. J. C. Steinman, President, in the chair.

The minutes of the last meeting were read and approved.

Mr. Thos. H. McCollin stated that Professor Charles Potts had lately called his attention to an interesting scientific phenomenon, which, although not particularly connected with photography, might be of interest to the members as such. By placing a piece of sheet metal or opaque cardboard, having a small pinhole through it, before the eye and looking at a white object that was illuminated—such as a white glass gas shade—moving it sideways, backwards, and forwards quickly, and but twice the diameter of the pinhole, one was enabled to see the network of veins and arteries of the eye.

Although it might not be new to scientists, still it was so to the members, who were much interested.

After a few matters of private business and the thanks of the President to the few members who had braved the storm (it being an unusually stormy evening) to attend, the meeting was adjourned.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

This Society met on the 15th February,—Dr. Vogel occupying the chair.

The Chairman mentioned that Herr Brandt, of Bayreuth, was about to publish his glass printing process in the *Correspondenz.*

Dr. Weissenborn stated that Herr Kampf, of Berlin, had applied for a patent for a new dipper for the silver bath, furnished with a clamp to keep the plate from slipping.

A letter from Herr Schoene, San Francisco, was then read, in which he mentioned that rain having fallen the former scarcity of water no longer prevailed, and trade was consequently reviving. He also said that a telescope was being constructed at Paris, for the new Californian observatory.

The Chairman said that was a mistake, as the telescope was being constructed by Herr Schröder, of Hamburg.

Herr Cochius showed a sample of "Thompson's fluid enamel" for glazing photographs, and a few pictures polished with it. The fluid is mixed with a little oil (any oil except linseed will do), and rubbed on the surface of the print just as the French polisher polishes furniture. The polish was also said to act upon wood or metal.

Herr Hoppe, Jun., showed a few *lichtpaus* pictures produced by Willis's aniline process, as slightly modified by Herr Hoppe. A discussion followed on the cost of production of photographs, but no decision could be arrived at, the cost being so variable.

The Chairman said it would be seen by the list just published that their Society was the photographic society having the largest membership in Germany, the number of members being 348.

Herr Schahl showed a number of negative films which had been drawn off with gelatine. These films were covered with spots, which could be seen when the negative was held between the eye and the light, and which produced flaws in the print. These spots only made their appearance after the gelatine had been poured on and allowed to dry. On being asked whether the spots might not have made their appearance in the negatives in the absence of the gelatine, Herr Schahl replied that he had never seen such spots on ungelatinised films.

Herr Hummel, and others of those present, said they had met with the same measly-looking spots, but could neither suggest a cause nor a cure for them. The hindrances to the transmission of collodion cotton were then discussed.

The question-box was opened and found to contain only the following question:—"Are very good results got from Husnik's dusting-on solution?" The questioner was referred to Herren Zipser and Joops's remarks at the previous meeting; and, on the opinion of the meeting being taken, it appeared to be that a longer experience and greater fidelity to routine was required to work the dusting-on process than to reproduce negatives by the carbon process.

The meeting was then adjourned.

Correspondence.

ALCOHOLISED GELATINE.—CURVED PLATES.

To the Editors.

Gentlemen,—As Mr. E. W. Foxlee has succeeded in forming workable gelatine emulsions containing a large proportion of methylated spirit, may I inquire whether he has ever met with failures with some samples of gelatine?

I have always used Nelson's opaque gelatine, as sold in sixpenny packets, for my experiments, and have found that not only would the emulsion not bear the addition of much spirit—especially if prepared with excess of silver nitrate—but also that the presence of small proportions of spirit prevented the homogeneous setting of the film, the bromide gathering into wavy striæ, apparently the result of a repellent action caused possibly by unequal evaporation.

I published some of my experiments at the time they were made; but no one came forward with an explanation of the cause of my failures. I have, however, inclined to the belief that some gelatines are more suited for the addition of alcohol than others. Mr. Foxlee will, therefore, confer a favour by letting us know whether he has tried many samples of gelatine—even of the same manufacture—for making alcoholic emulsions. I shall be much surprised if, in the absence of an invariable manufacture, those who follow up Mr. Foxlee's suggestion succeed to their entire satisfaction.

The method given by Mr. Foxlee for coating curved plates is, doubtless, practicable; but I think that that method will require the emulsion to be of a kind giving a dense image. This quality zinc bromide and excess of silver nitrate will give to an eminent extent; but the emulsion is rather given to red fog *as well.*

From experiments I made some time ago I could perceive that it would be for some purposes a distinct gain to coat the plate with a porous collodion, and sensitise in a bath. An emulsion is hardly admissible on account of the difficulty of making a good washed emulsion with "porous" collodion. An unwashed emulsion might, perhaps, be used; but it should be of a kind giving fair density, and must contain but little free bromide. In any case the plate should be washed in warm water, and then coated with warm gelatine emulsion, which must be allowed to soak well into the film; after which the excess is drawn off, and the plate is dried in a horizontal position. The gelatine emulsion should, in this case, be the most sensitive obtainable, density being conferred by the collodion film. The gelatine emulsion should not form a thick film on the surface of the collodion, otherwise the developer will hardly penetrate so as to act upon the parts which form the denser tones of the negative.

If the collodion film be prepared in the nitrate bath it should be allowed to remain there for some time, in order to convert as much soluble bromide as possible. Fifteen minutes in an eighty- or ninety-grain bath would, probably, be found sufficient.—I am, yours, &c.,

31, *Grove Place, Brompton, S. W.* Herbert B. Berkeley.
April 15, 1878.

RE COLOURED CHROMOTYPES.

To the Editors.

Gentlemen,—I observe in your issue, received today, a letter from Mr. Hicks respecting my patent. Speaking for himself and the majority of the profession—I have not heard a word except from him, and do not know of whom and how many his majority consists—Mr. Hicks says that "the adding of pigments to collodion for several purposes has been known and practised for years." Doubtless such is the case "for several purposes;" but it has never been used for the especial purpose or in the manner in question. I have the written testimony of the Autotype Company that they, the legal patentees of the processes to which my patent is applicable, knew nothing of the means by which I obtained my results.

You and many others have tried to guess how the operation, simple as it is, is performed, and you were the nearest the mark of anyone, though as regards the way in which the exhibited examples were done you were in error. You said by collodion. Right; but you said by preliminary coloured collodion. So far as the specimens in question are concerned you were absolutely *wrong.* They were treated according to my *special* invention, viz., *after* the chromotype print had been developed and fixed with alum water and dried the plate was flowed with coloured collodion prepared specially and carefully for the purpose, and then, as soon as the collodion was set, the print was transferred in the usual way.

This coating of the untransferred picture with coloured collodion is the innovation on, or addition to, the chromotype process which is the subject of my patent; and Mr. Hicks may protest a thousand times, but unless he can prove that he or any one else has ever used anything in the special way in which I use my coloured medium he had better save his time and trouble and the valuable space he occupies in your Journal.

I made my specification as clear and concise as I could, and endeavoured to describe some of the failures which arose during the numerous experiments I was obliged to make, especially as regards aqueous solutions.

I must add a few lines which might have been made the subject of another letter. I have reason to believe that prints produced according to my system will be absolutely as permanent as oil paintings. There *ought* to be nothing to fade or change colour. Referring to the fading of chromotypes now under discussion (not to mention silver prints) there should be nothing of the sort. For this reason: nothing which can be changed by light ought to be exposed, as, for instance, gelatine, albumen, &c. These turn yellow. My principle is, supposing the pigments in the carbon tissue (the image) to be permanent as regards colour, that the *background* shall be equally so; and this I produce by a thin film of cotton (pyroxyline) charged with colours acknowledged to be permanent. Any colours can be used, the only point being to have the collodion film properly charged with *permanent* pigments, so as to form a shield for the possibly changed gelatine, &c., at the back.

If you want a nearly white background use *zinc* white (*not* flake white, or white lead) with a *trace* of black, rose madder, or blue, &c. Prussian blue is apt to turn green. Indigo, I am told, will not stand. Vermilion is very doubtful except it be of the finest quality. The blue which I have used is an earth named here "blue ochre," and is used by the farmers for marking sheep. I have exposed it to light for many weeks and do not find it change. It is an earth.

As sold the price is one shilling per pound, but I sent a pound to Messrs. Winsor and Newton to levigate it for me, and they charged me sixteen shillings for so doing. It was passed through five processes; but I do not think this necessary, as previously I had ground it myself in a mortar with good results, nevertheless it goes a long way.

I need not say anything more as to the best permanent colours, as there are many works on the subject. I believe all the earth colours and some of the chemicals are reliable; but I do not believe in vegetable colours (except the madders) or aniline dyes. Of course, a six months' experience cannot render my opinion of much value, but I give it for what it may be worth. Some pigments are permanent, some are not; and it remains with others as well as myself, from time to time, to enlighten our brethren as to results well ascertained. I try the colours in the way which has been suggested—exposing half the picture to full light and masking the remainder.

Apologising for having drawn out this letter to so great a length,—I am, yours, &c., Thos. Parkyns.
Harnham Cliff, Salisbury, April 12, 1878.

To the Editors.

Gentlemen,—Your correspondent "T. S. Hicks" complains about a patent being taken out for tinting chromotypes by using tinted collodion.

I can tell your correspondent how to produce a similar effect by a process that is not patented. It consists simply in tinting the transfer paper.—I am, yours, &c., A. Whitham.
192, *Yorkshire-street, Rochdale, April* 13, 1878.

Converging Perpendiculars.—We recommend the following elementary experiment to those of our readers who are in doubt as to the effect of tilting the camera without using the swing-back when taking an architectural subject:—Take out the front board of the camera and substitute a thin piece of blackened cardboard for it. In the centre of this substituted front pierce a small hole by a darning needle. Now place the camera in front of a well-lighted architectural subject and view it on the lowering screen. Tilt the camera, and it will be found that the perpendiculars will converge; bring the swing-back vertical and the perpendiculars will be parallel lines. Level the camera, cover up the hole made, and pierce another higher up in the cardboard front, and it will be found that, if the hole be pierced at the right height, the same amount of view is included as when the camera is tilted; and that if the swing-back be vertical the perpendiculars are still parallel. Now a lens is simply a substitute for the pinhole, and is an optical artifice for increasing the illumination of the view. Both the pinhole and the lens will give correctly the projection of the view on any plane on which it is thrown, whatever its inclination, for perspective is merely a matter of angles and not of absolute heights. The optical centre of a lens occupies the position of the pinhole in the foregoing experiment; and, broadly it may be stated, that a knowledge of the position of the axis is only useful to know for focussing purposes. One quality of a theoretically perfect lens is that when it is rotated in any direction round its optical centre every emergent ray should continue its path in the same direction that it had where incident. There is no lens of any use which answers absolutely to this condition, but the existence of the pantascopic camera is a proof that, for small angular rotation round the optical centre, it is nearly fulfilled.—*Photo. Journal.*

Photography in Court.—In the Shoreditch County Court, on Thursday, the 11th inst., the case of Ross *v.* the Great Eastern Railway Company was heard. The plaintiff, a licensed hawker, sued the defendant company for £3 16s., being the value of eight dozen photographic pictures, together with loss of anticipatory profits.—Plaintiff said in the end of January last he had a parcel containing the goods forwarded by the company to Cambridge, whither he was proceeding the same day.

The photographs contained a coloured portrait of His Royal Highness the Prince of Wales, who was then about to visit Cambridge. Plaintiff called for the parcel at the railway station early on the morning of the Prince's visit, but was told it had not arrived. He called twice afterwards, and could gain no tidings of the parcel. Plaintiff reckoned on disposing of the whole of the photographs (the ordinary price of which was twopence each) in consequence of His Royal Highness's visit to the town. The photographs frequently fetched higher prices, especially in places where the inhabitants were very loyal.—A witness on behalf of plaintiff said he had often sold these photographs at sixpence, and even half-a-crown, each. He had followed His Royal Highness through India, and sold the photographs at two and three rupees. His profits were upwards of £700 by the Indian tour. He had also "accompanied" the Prince "all over Europe," and made large sums through the sale of the same pictures. Witness's occupation, as well as that of plaintiff's, sometimes consisted in following the members of the Royal Family, and selling their photographs.—For the defence it was alleged that the plaintiff had never called for the parcel, which had arrived at the office and was ready for delivery, and that, in respect to anticipatory profits, he had no right to sue. The first part of the defence having been substantiated by witnesses, a long argument ensued as to the claim in respect to prospective profits.—In the result, his Honour gave judgment for the defendants, principally on the ground that plaintiff had concealed the fact of the company tendering the goods subsequently.

EXCHANGE COLUMN.

Wanted, Solomon's No. 7, Dallmeyer's 1B long, or good half-plate lens, in exchange for other apparatus.—Address, A. K. S., Whitley-brow, Melksham.

Wanted, a good posing chair, in exchange for first-class saloon rifle; cost four guineas a short time since.—Address, JOSEPH NICKLIN, Dresden, Staffordshire.

ANSWERS TO CORRESPONDENTS.

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

NOTICE.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

J. S. R. S.—A solution of the neutral oxalate of potash will not precipitate iron persalts, but this is not the case with respect to the protosalts.

H. B.—1. In your case the convergence is owing solely to the camera not having been carefully levelled.—2. Thanks.—3. The focus of the lens need not exceed twenty-five inches.

GEORGE WOOD.—There is no definite rule, but the following hint will suffice in practice:—If there be a well-pronounced object in the foreground do not keep the lenses so wide apart as when the principal foreground object is farther away.

AN AMATEUR.—You may reproduce any of the articles or jokes appearing in *Punch* provided you make the usual acknowledgment; but, while this is legal, permission is not granted to take a similar liberty with any of the cartoons, even by making the fullest acknowledgment. In this latter case special authority must be obtained from the publisher.

A. & S. (Edinburgh).—The patent for the aniline process of printing has not yet expired; but, if we recollect aright, its term of fourteen years' duration comes to an end about the close of the present year. This will be glad news to many; for it is pretty generally understood that the holder of the patent has declined to grant licenses, or to allow any other than his own firm to practise it.

A NEW SUBSCRIBER.—You have quite correctly estimated the facts—full details were published three months prior to the date mentioned. On application to the Publisher, any of the numbers of this Journal issued within the past three years can be obtained; there are, of course, numbers in stock of previous dates, but the last three years' issues will amply cover all the ground referred to in your letter.

MAUD BROWN.—The difficulties you experience appear to be mainly owing to the use of a glutinous collodion. This may, perhaps, be accounted for by your having allowed the stopper to remain out of the bottle for such a period as permitted the ether to escape by evaporation. Thin the collodion by adding ether alone, avoiding the addition of alcohol. Collodion that has been bromo-iodised with cadmium salts is much more liable to become glutinous than when ammonium salts are used for this purpose.

D. T. O.—The tone of prints is so much a matter of individual taste that we should hesitate in advising you to adopt that of any of the prints enclosed. For our own part we prefer No. 3, but others might like a colder tone. The better system to adopt would be one in which the tone is such as to afford a slight indication of the complexion—a fair complexion, with red, auburn, or light hair receiving toning of a corresponding character.

J. (Kensington).—About ten or twelve years ago several printing-frames specially designed for printing opalotypes were introduced. While it would be impossible for us to describe the construction of any of them in this column, we know that in our volumes of that period all, or nearly all, of them have been described or alluded to, and hence we must refer you to the volumes in question. They may be seen on application at our publishing office if you have not the volumes upon your own shelves.

D. H. B.—You have not been misinformed; there did exist, several years since, a serial named the *Illustrated Photographer*. It was published weekly, price threepence, but after a period of somewhat over two years its demise took place.

S. N.—Although almost any kind of spirit varnish may be employed for freshening up your decayed leather miniature cases, yet the best kind for this purpose, and that which is for the most part used by bookbinders, consists of three ounces of sandarac dissolved in a pint of alcohol. Before making a special varnish for the intended purpose try the effect of ordinary negative varnish applied by means of a soft brush, the case being then held before the fire until it has become quite dry. This treatment will scarcely fail to restore the leather to its original freshness.

T. O. B.—We note in your specimen the presence of numerous minute air-bubbles, indicating defective manipulation. So *very* much has been written on the details of enamelling paper prints that we must request you to institute a close comparison between your method of working and those adopted by others who have been more successful. You may mount such pictures either direct on the card or previously on a stouter paper of a degree of thickness similar to good cartridge paper. The air-bubbles to which we have referred as existing in your print are between the collodion and the paper.

INTENDING TOURIST.—Do not proceed on your tour without a wide-angle lens, and, for your size of camera, one having a focus of seven inches will produce a picture including 90° on the base line, which is quite enough. But let it be understood that we do not recommend you to make constant or even frequent use of such a lens; indeed, in the course of your peregrinations you will meet with very few subjects upon which it could be fittingly used. Still, there are buildings, lake scenes, mountain ranges, and other similar subjects in photography for which a wide-angle lens will prove invaluable. For *ordinary* work we advise you to select lenses of twelve, sixteen, and twenty inches in focus. These, with the wide-angle combination of which we have spoken, will prove a useful and complete outfit of lenses.

GEORGE J. KENNEDY.—To produce a "ghost" in a stereoscopic picture, arrange all the sitters so as to be looking at the place where the ghost is supposed to be, their attitudes and expressions conveying the idea of awe, fear, or any other kindred emotion. Now photograph them; but when the exposure has been two-thirds completed let the lens be capped for a few seconds, during which interval the individual who enacts the part of the ghost enters suitably attired, and takes his place in the circle, the sitters all the time being motionless. The remaining third of the exposure is now given and the picture developed. When completed the "ghost" will appear quite sharp, yet misty and transparent; and altogether the effect will be somewhat startling, especially to those who are ignorant of the method by which the result was produced.

SEVERAL CORRESPONDENTS.—An unusual number of letters have this week been received from correspondents who have neglected to comply with our rule (so frequently printed at the head of this page) requiring the name of every correspondent, although not for publication. The respective writers of these letters will therefore know the reason why their queries remain unanswered.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.**

LONDON GAZETTE, *Friday, April* 12, 1878.

PARTNERSHIP DISSOLVED.

HARTLAND AND O'DONOVAN, Clifton, photographers.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.
For the Week ending April 16, 1878.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

April.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
11	29·95	SE	45	45	52	44	Raining
12	30·16	E	46	48	62	42	Hazy
13	30·05	SE	48	51	63	42	Foggy
15	30·03	SW	51	53	62	47	Dull
16	29·84	W	50	52	—	49	Raining

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 938. Vol. XXV.—April 26, 1878.

VARIATIONS IN THE IRON DEVELOPER.

Last week we called attention to certain effects which could be obtained by a slight departure from the usual routine of iron development with wet plates, and we gave full details of the peculiarities of citric acid when employed as a restrainer in conjunction with acetic acid. We have made very many experiments with it, and our trials, tentative at first, have led to our adopting it as a stock dark-room solution for regular use, and under such contingencies as we have fully dwelt upon in the article to which we have referred.

We pointed out how the greater degree of intensity conferred upon the negative was accompanied by a corresponding decrease of the sensitiveness, and we feel almost justified in saying that a special gain in intensity in wet-plate development, whether caused by peculiarities of the bath or the collodion, or by additions to the developer, is invariably accompanied by a loss of sensitiveness. This rule scarcely admits of an exception, though the degree of extra intensity is not always a guide to the extent to which the sensitiveness may be diminished. It is of such universal application as to lead us to expect that its converse would hold good, and that a thinner deposit would be accompanied by a gain in the exposure. We have, however, not found this to be the case, though it may have been observed that, whenever a variation of the developer to increase sensitiveness has been brought before photographers, it has more frequently happened than not that the resulting negatives have been weak and feeble. And, *en passant*, we may observe that it is very easy to fall into an error in this direction. The result of over-exposure, under ordinary conditions, being the production of a weak and flat negative, it is easy to imagine that when a negative is weak and flat it is over-exposed, and, as a consequence, that a gain in sensitiveness has been obtained in any experiment in hand.

Our present remarks will be directed to the effects of *gelatine* in the iron developer, which, in the form of collocine, has again attracted considerable attention. There will be many of our readers who will remember the great excitement caused a number of years ago by the publication of Mr. M. Carey Lea's method of preparing a developer to which had been added the compound obtained by acting upon iron by mineral acids in the presence of solution of gelatine. The product obtained possessed some very remarkable and exceptional qualities; but, owing to the troublesomeness of preparing the liquid, and the strange discrepancies in the published accounts of experiments made with it, the compound, notwithstanding its many valuable qualities, fell almost into entire disuse. A modification of the principle led to an easier method of obtaining a gelatine compound, and, again, many took up the new developer, and on all sides we heard well of it. Nevertheless, after many inquiries, we still do not find that it has obtained any great hold on the photographic fraternity, who, though willing enough to try experiments, are frequently found lacking in either energy or belief to carry out in practice the indications their experiments point out if there be much *extra* trouble in connection therewith.

We have tried most of these additions and pointed out their advantages, and we can readily understand any objection to the extra labour involved, slight though it is, in their preparation. We have, therefore, endeavoured to simplify still further a process in which gelatine should play a prominent part, and after a number of experiments, which need not be detailed, we have found by successive eliminations that a pure solution of gelatine alone added to the developer confers on it exceptional and remarkable powers, a most minute quantity being sufficient to entirely change the character of the solution.

A twenty-grain solution of protosulphate of iron, with eight or ten drops of glacial acetic acid, may, by the addition of a tenth part of a grain of gelatine to the ounce, be kept on the film without fogging the shadows till every trace possible of the most under-exposed image is brought out. It would be a long time before it became muddy, and the density and character of the deposit would be more like that from pyrogallic. It is almost impossible when it is used to fog the plate; and for copying oil paintings and other objects from which it is difficult, by reason of their low illuminating power, to obtain dense negatives the addition of the gelatine enables any amount of intensity to be obtained with little trouble.

Used as an intensifier, where density of deposit is the chief aim, it would quite enable us to dispense with the use of pyrogallic acid. There is not, of course, an entire similarity in the action of the two, but in a large number of cases the gelatino-iron developer or intensifier would answer all purposes to which pyro. could be applied. With regard to rapidity, we are compelled to say that this developer, like all others, follows the rule we have enunciated above, and that, consequently, when used as a developer, in the first instance, a close comparison will show it to be inferior in this respect to ordinary iron developer; but the difference is not great, and when a small quantity of the gelatine is used it would require a very close comparison between a pair of trial negatives to discern which was the more exposed.

We have only observed one drawback to its use, and that is very insignificant: it is that more than usual care is needed to avoid the formation of air-bubbles when pouring on and off the plate; for when once they are formed it is next to impossible to make them coalesce or disappear till the development is complete. With regard to the amount to be added a very wide latitude is permissible, increase of density following upon increase in the amount of gelatine.

Finally, as to the method of adding the gelatine: we find it will keep dissolved in acetic acid almost indefinitely. A standard solution of a definite strength should be made, and one or more drops per ounce added to the iron solution either at the moment of using or to a quantity in bulk. We have sometimes thought, but have not yet positively determined, that, when kept in contact with the iron solution, its density-imparting powers have been intensified.

DRY PROCESSES—ANCIENT AND MODERN.

III.—TANNIN, COFFEE, GUM-GALLIC, AND BEER AND ALBUMEN PROCESSES.

It was Dr. Hill Norris, of Birmingham, who first laid the foundation and practically worked out the principles upon which dry collodion plates should be prepared. The pores of the collodion must, he said, be charged with a material that would prevent their being closed permanently, but which would allow of the permeation of the developer, and also act the part of a varnish to prevent the atmosphere from having access to the atoms of iodide of silver upon which the sensitiveness depended.

Based upon these principles a considerable number of dry processes have been brought into existence, the chief difference between them consisting in the special kind of preservative determined by experimental research or whim. It would be quite foreign to our purpose to describe even in outline those processes which have flashed across the photographic empyrean and, after making a bright but momentary appearance, have sunk into obscurity, no more to be resuscitated; but to those which have been recognised as undoubtedly meritorious we shall make an exception.

Occupying a foremost position among these is the tannin process. In this a plate is collodionised and sensitised as for wet collodion practice; it is then thoroughly washed, and a ten-grain solution of tannin applied. This process is very simple, very certain, and the results obtained are excellent. The plates keep well, but they must be developed within a few days after exposure—the sooner the better. The development may be effected by either alkaline or acid pyrogallol; in the latter case a longer exposure is required than in the former. Plates may be prepared by this process having sensitiveness quite equal to wet collodion, but in this case the collodion should be salted with a bromide (eight grains to the ounce), and the sensitising bath must rather exceed than be under the strength of sixty grains. Alkaline development is here imperatively necessary. The plate must be kept in the silver bath from ten to fifteen minutes, and the tannin may be washed off by a gentle stream of distilled water. Instead of employing a solution of tannin alone an infusion of malt may advantageously be mixed with it.

A strong infusion of coffee (a dessert spoonful to a cup of water) may be used instead of tannin, and, in this case, the process derives its name from the fragrant Mocha berry. The details of the "coffee process," however, are so similar in every respect to that in which tannin is the preservative as to require no distinction in the description of the method of treatment. If any young photographer is at a loss which dry process to try his "'prentice hand" upon let him begin with the simple and excellent coffee process.

With greater detail we shall describe two other bath processes of more recent introduction than those just mentioned, and by means of which high-class results have been obtained. We allude to those in which a preservative of gum and gallic acid and of beer and albumen are respectively employed.

The former of these is well known by the name of the "gum gallic process," which designation was given to it by Mr. R. M. Gordon, by whom it was introduced. An ordinary good commercial bromo-iodised collodion should have two grains more of a bromide, such as that of ammonium or cadmium, added to it, and the bath must be one not under thirty-five grains of silver per ounce. When the plate has been excited it must be thoroughly washed and then coated with a three-grain solution of gallic acid. The readiest manner of preparing this is to make a strong solution of the acid in *hot* water; as the water cools the superflous acid is precipitated until, when it has become quite cold, no more than three grains per ounce have been retained in solution. After draining the plate to which this solution has been applied coat it with the following:—

Gum arabic	20 grains.
Sugar candy	5 „
Water	1 ounce.

These plates, after being dried, keep well for a considerable period, and if the developer (an alkaline one) be strong the exposure required need not much exceed that given to wet collodion plates.

A mixture of beer and albumen as a preservative for dry plates was first proposed by Mr. W. H. Davies, but the details now to be given are those which have been adopted by Captain Abney, who has modified and employed this process with great advantage. Beat to a froth the whites of any desired number of eggs, having previously added a drachm of ammonia for each egg. To half a glass of bitter or mild ale are added ten grains of pyrogallic acid. The plate is collodionised and excited as in the process previously described, and it is then washed very thoroughly to get rid of the free nitrate of silver. A mixture of equal parts of the albumen and plain beer is now applied to the film, and after being allowed to remain on the surface for half-a-minute is poured off. The plate is once more washed thoroughly, and then receives an application of the beer containing the pyrogallic acid, after which it is reared upon end to dry spontaneously. Plates thus prepared will keep a month after exposure, and possess a degree of sensitiveness nearly equal to that of wet collodion, alkaline development being presupposed.

PHOTOGRAPHING BY THE ELECTRIC LIGHT.

Our readers are all aware that portraits are at present being taken by means of the electric light, but we have now to record a much more extended application of the illuminating power of the carbon points.

From Mr. J. R. Prophet, of Dundee, we have received an excellent 10 × 8 print of an architectural view taken within an hour of midnight under circumstances which will be ascertained from the following extracts from a letter that accompanied the picture:—

"This photograph was taken on the 13th inst., about eleven o clock at night, during a drenching rain and in a crowded thoroughfare, with a Dallmeyer's 4a 10 × 8 portrait lens, having a diaphragm two and a-quarter inches in diameter. I exposed for a quarter of an hour and developed with iron. The electric light was about eighty feet distant, and was given by the electro-dynamic machine, producing a light equal to 800 candles. The machine was one of the Gramme order, driven by a small steam engine. With light from the sun it would have been impossible to have taken the picture—first, because sunlight would have shown the falling rain and so obscured the view; and, secondly, because of the dense crowds which thronged this street, and which, upon this occasion, stood to gaze upon the building lighted, thus covering the lower portion of my subject and the pavement with a mass of umbrellas. The crowd being compelled by the heavy rain continuously to move off before the black mass could be photographed, they do not appear in the picture, and with the movements of the figure and the long exposure the reflection on the wet street had, as you see, an occasional chance of being produced in the picture. An 800-candle light is a comparatively weak light to what can be produced, and yet the satisfactory result obtained under such unfavourable circumstances proves that the time is nigh at hand when, to a great extent, we will be independent of sunlight for photographic purposes. The result also illustrates the close relation of our art with mechanics and the sciences."

The resulting picture shows in what an excellent manner a photograph may be produced by artificial light. Several years ago we recorded the fact of the interior of caves and mines having been photographed by means of the magnesium light; but this is the first time, so far as we are aware, that the electric or any other kind of artificial light has been employed to illuminate architectural structures for photographic purposes.

RECENT PATENTS.

No. VII.—EDWARDS'S ENLARGING AND COPYING CAMERA.

Very numerous indeed are the appliances, mechanical as well as chemical, which have been imported into photographic service in producing copies and enlargements of pictures. Among the cameras expressly constructed for this purpose is one by Mr. B. J. Edwards, of Hackney, which contains several features tending to facilitate the purposes above expressed. For this camera with its adjuncts Mr. Edwards has obtained a patent, and from the following summary of the specification an adequate idea of its points will be obtained:—

This apparatus consists of a board or frame, of convenient length and width, arranged to carry or support another frame or board sliding upon or under and parallel to the same, this sliding board being worked by an extending screw fixed to the other or principal frame and worked by a handle, the nut of the screw being fixed to the sliding board or frame, which carries an upright piece, frame, or board, to which is affixed the picture or drawing to be copied.

When the picture to be copied consists of a transparent positive or negative photograph, the patentee uses a reflector of white paper, glass, or other suitable material, placed at an angle a few inches behind the transparent picture, and he also uses an adjustable hood or shade to cut off all light from between the transparency and lens of the camera.

The camera may be a separate instrument, or the necessary parts thereof may be attached or fitted to the principal frame, but not so as to interfere with the working of the screw or the sliding frame which carries the object to be copied, and which object is brought into the focus of the lens, and adjustable by means of the screw before described.

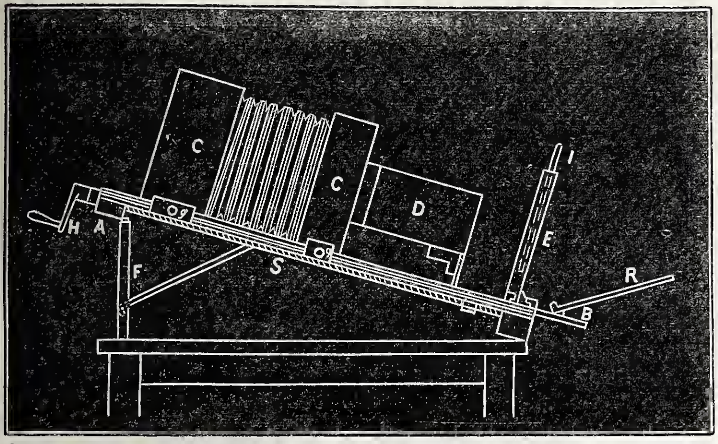
The upright frame or board carrying the drawing to be copied is made to slide both vertically and horizontally at right angles to the sliding frame, in order that it may easily be adjusted to the proper position.

In order to allow a large amount of light from the sky to fall upon the picture to be copied, or upon the reflector, Mr. Edwards raises one end of the apparatus and supports it by a foot or strut at a suitable angle; by this means he considerably reduces or shortens the time of exposure necessary to produce the photographic impression.

By means of the apparatus above described, and especially by means of the screw which adjusts the position or focus of the object to be copied, great facility and accuracy with economy is claimed to be obtained in the photographic reproduction or enlargement of drawings, photographs, or designs.

The invention is more fully explained by the following diagram, in

FIG. 1.



which *fig.* 1 shows a side view of an apparatus for copying or reproducing by means of photography pictures, drawings, photographs, or designs specially intended to facilitate the production and ensure the accuracy of such copies or reproduction, whether they are required enlarged or reduced in size, or of the same dimensions as the originals.

A is a base board or frame of convenient length and width, arranged to carry a movable frame or board B sliding upon or under and parallel to frame A. This sliding board is moved by means of an extending screw S fixed to the frame A, and worked by a handle H. The end of the said screw is fixed to the board B, which carries an adjustable upright frame or board E, on which is affixed the picture or drawing to be copied.

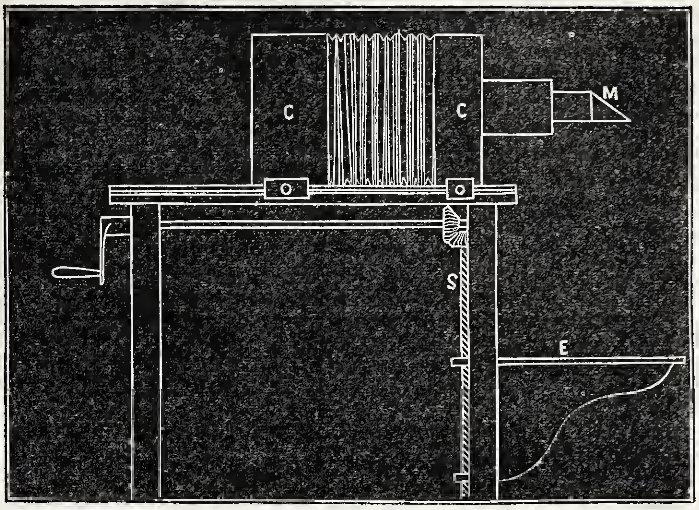
When the picture consists of a transparent positive or negative photograph the board E is replaced by the sliding frame or frames I, which carry the transparency; and a reflector R of white paper, glass, or other suitable material, placed at an angle a few inches behind the transparent picture, is also made use of, an adjustable hood or shade D being also employed to cut off all the light between the transparency and the lens of the camera C. The camera is attached to the base board A by means of the clamps *g*, which slide in grooves, so that the said camera may be drawn out to the required length, when it is kept in position by means of the screws attached to the clamps *g*, the whole being arranged not to interfere with the working of the screw S on the sliding frame E, which carries the object to be copied, and which is brought into the focus of the lens by means of the adjusting screw S.

The frame is made to slide vertically and parallel to the sliding frame E, which is also made to slide across the board or frame B, in order that the object to be copied may be easily adjusted to the proper position.

In order to allow a strong light to fall upon the picture to be copied, or upon the reflector R, one end of the above-described apparatus is raised by means of a support F so as to place it at a suitable angle. By this means the time of exposure necessary to produce the photographic impression is reduced.

When it is desired to make reversed negatives, as used for various photo-mechanical printing, an apparatus similar to the one above

FIG. 2.



described is employed, but arranged as shown in *fig.* 2. In this case the sliding board E carrying the drawing is made to move vertically by means of the screw S worked from the side by bevelled wheels or other suitable mechanical arrangements—a reversing prism or mirror M, the camera C being at right angle to the drawing, being also used.

By the use of the apparatus above described, and especially of the screw S, which adjusts the position or focus of the object to be copied, greater facility, accuracy, and economy are obtained than heretofore.

The special claims in this patent are two:—Firstly. A bed or frame capable of being placed at an angle, and on which is made to slide (by means of a screw) a movable upright frame, which carries the object to be copied, and having at the back a reflector—the above parts being, in combination with a camera, furnished with a hood or shade to cut off all light between the transparency and the lens of the said camera for the purpose set forth, substantially as described and represented in *fig.* 1.

Secondly. The movable frame, sliding vertically, and adjusted by means of a screw in combination with a camera and lens fitted with a reversing prism or mirror, for the purpose set forth, substantially as described and represented in *fig.* 2.

Of the great convenience of the adjustments which have been described there will doubtless be only one opinion.

OXALATE DEVELOPMENT: IMPROVED METHODS.

A fortnight since I sent to The British Journal of Photography a method of improving the action of the oxalate developer by the aid of gallic acid. I propose here to describe the proper mode of applying the gallic treatment, as since ascertained, and also to mention another method of modifying the action which has, perhaps, advantages over the gallic.

Use of Gallic Acid.

The essential point with gallic acid is *not to use too much*, otherwise its action is altered, almost reversed. With a proper dose of gallic acid there is a marked increase of brightness and cleanness, and an increased intensity. The whole action of the developer is better, and more pleasant and manageable. To an ounce of developer I would recommend three, four, or five drops of a sixty-grain solution of gallic acid in alcohol. In saying this I mean, of course, to an ounce of diluted developer ready for immediate application.

The addition of gallic acid to the oxalate solution causes a decided darkening, owing to the fact that the ferrous oxalate always contains more or less ferric oxalate. This darkening is without importance; it does not stain in the least, but every trace of it washes out with the utmost ease. In fact, this dark solution gives a cleaner and purer development than a colourless alkaline pyrogallol solution.

Application of the Collo-Restrainer.

Gelatine, modified by boiling with sulphuric acid in the manner which I have described for the wet development, gives most excellent results with the oxalate. This collo-developer, or collo-restrainer, is prepared precisely as already directed, and is used in the same way, except that, as the oxalate development is far more powerful than the ferrous sulphate development used in the wet process, the collo-restrainer may be employed in larger proportion. Instead of one drop to three ounces, I use in the oxalate development from one to six drops per ounce, graduating the proportion according to circumstances, which scarcely need to be explained. If there has been over-exposure, or the object has presented a lack of contrast, I use five or six drops; for an exposure which has been too short, a single drop. In ordinary cases, with fair exposure, about two drops will be sufficient. Something will also depend on the strength of the oxalate solution, relative to which see below.

The mode of operating is, on the whole, perhaps preferable to the gallic acid treatment. Both are very decided improvements on the oxalate development—so much so that I am very sure that no one who tries them will ever use the plain oxalate afterwards. The collo-restrainer has the advantage that it does not in the least discolour the developing solutions. For those who like to use the oxalate as a bath, and to make several successive developments in the same liquid, it is certainly better. A solution containing ferrous oxalate and gallic acid must tend to continually darken by exposure to air. Of course, any solution of a ferrous salt must deteriorate by exposure to the air, but an exposure of an hour or two would not destroy the developing power of an oxalate bath. If, however, it contained gallic acid it would, probably, be much darkened.

This modified gelatine has no developing power. I have tried it in connection with solution of potash and did not obtain any image. Consequently to call it a "collo-developer" would seem to be inappropriate. I, therefore, speak of it as a "collo-restrainer," which name seems to describe its function better, though not completely; for it not only restrains but intensifies. When it is employed—especially when in the quantity of five or six drops to the ounce of developer—a much intenser, stronger, and blacker image is obtained than without it.

General Remarks on the Oxalate Development.

Several questions have presented themselves for solution in connection with this development. And, first, as to the best condition of the solution, whether it should be *alkaline*, *neutral*, or *acid*. Potassio-ferrous oxalate is perfectly neutral. It can be acidified without decomposition; it can also be rendered alkaline up to a certain point. Enough sodic carbonate can be added to it to render it slightly alkaline without causing a precipitate.

In my work last spring I used a slightly alkaline solution of potassic oxalate for dissolving the ferrous oxalate; but a careful comparative trial now satisfies me that the oxalate developer ought to be neutral, for the very sufficient reason that the image so obtained resists the action of the fixing solution much better. The slightly alkaline solution developes equally fast and may seem to do equally well; but when the developed image is removed from the hyposulphite solution it is found to have much deteriorated. The neutral and acid oxalate do not present this inconvenience, but resist very satisfactorily.

But an acid solution of potassio-ferrous oxalate developes much more slowly than one that is neutral. Contrary to what might be expected, the acidity does not give any additional clearness or brightness. For that effect we must depend upon the collo-restrainer, or upon gallic acid. Acidifying the oxalate simply checks its action disadvantageously, and produces a poor, flat, and thin image. *Therefore, the solution should be neutral.*

Another point suggested itself. Ferrous oxalate forms soluble double salts with soda and with ammonia oxalate, as well as with potash oxalate, and the question arose whether either of these others would have an advantage over the potash salt. Solutions of all three were prepared, using the same ferrous oxalate for all, and on comparative trial it appeared that not only the ammonia and the soda salts offered no advantage, but they proved distinctly inferior to the potash salt.

As to the strength of the developer: this is not easy to describe, as the double oxalate will be usually prepared in solution, and each person will be apt to prepare his solution of different strength. Equality of result is, perhaps, best obtained by preparing a solution saturated in the cold, and this may be done by dissolving neutral potash oxalate in thrice its weight of very hot water, and adding immediately ferrous oxalate as long as it will dissolve. The dark red solution deposits in cooling a little of the double oxalate in reddish-yellow grains, leaving a saturated solution behind. Except as one way of obtaining a definite strength it is not necessary to make the solution so strong. Potassic oxalate may be dissolved in water, 100 grains to the ounce, and this solution may be saturated with the ferrous oxalate. Perhaps this is as good a means as any for obtaining a preparation of a regular strength. In this case no heat is necessary. The neutral potassic oxalate is simply put into a bottle with the requisite proportion of cold water, and ferric oxalate added as long as by shaking and standing it continues to dissolve. The bottle will not need any protection from light, but should be kept well corked, and not more than enough for a month or so should be made at once.

If the saturated solution is made it should be diluted for use with twenty to forty parts of water. With the less strong—that prepared with 100 grains' solution of potassic oxalate—I would take from ten to thirty parts of water. Circumstances may arise in which stronger developers may be desirable, especially in case of under-exposure; but my preference is for the weaker treatment, and I would recommend its trial. No one on taking up a totally new form of development, such as this is, can expect to pass from the alkaline pyrogallol to it instantly, and to get its very best results at the first effort; and the best way to become skilful with it is to work from weak solutions up to stronger. If on the application of the developer the image comes out rapidly but flat and of a cold slate colour, assuming as the action continues a sort of blurred look before any sufficient density comes, it may be accepted that the oxalate solution has been used about five times too strong for the case in hand; and then no amount of restrainer will do any good or give brilliancy—not half-a-drachm to the ounce. With the oxalate development it is never desirable to make the image flash out, but rather to bring it out in an orderly and regular way, that its character may be watched as it appears.

As has been explained in previous communications, I obtain ferrous oxalate by adding a hot solution of oxalic acid to one of ordinary ferrous sulphate, such as is used for wet development. The precipitate goes on forming for some time. At the end of two or three hours the supernatant liquid is to be poured off, fresh water added and well stirred up, and poured off after subsiding. Two portions of fresh water will be a sufficient washing.

As it is desirable to avoid the presence of the ferric salt, one should choose a clean, bright green specimen of green vitriol, the best quality of what is made for photographers' use. When it is intended to use gallic acid we can get a particularly good product by acidulating the solution of green vitriol with sulphuric acid, dropping in some clean nails, tacks, or piano wire, and letting it stand over night. By this treatment all ferric salt present is deoxidised. This, however, is not a necessary precaution, but rather a little nicety for those who like to have their chemicals in the best possible condition. M. Carey Lea.

THE LATE MR. J. A. SPENCER.

With much regret we have to record the death of Mr. J. A. Spencer—an event which took place on Saturday morning last, the 20th instant. He died at the comparatively early age of 51. This announcement will be received with surprise by many, and regret by all; for the courteous manners and genial disposition of Mr. Spencer secured for him a very extensive circle of friends.

Mr. Spencer's name has long been familiar to every photographer—originally in connection with the manufacture of albumenised paper, and more recently as an ardent devotee of carbon printing. Having completed his education at University College, he at an early age devoted himself to chemical science, for his father followed that profession, his establishment being in Lamb's Conduit-street, to which business he eventually succeeded. Previous to this, however, he studied chemistry systematically under Dr. Hoffman, at the College of Chemistry. Having exhibited several of his chemical manufactures, including naphthaline, benzoic acid, hydriodate of quinine, theine, caffeine, &c., at the great exhibition of 1851, he was awarded one of the few bronze medals then given for the excellence of these productions. About this time there was a polytechnic department in connection with the newly-established Panopticon, afterwards the Alhambra—an establishment that has since that period adopted a vastly different *rôle* in catering for the entertainment of the public—and in this department Mr. Spencer received the appointment of demonstrator of applied chemistry—an office he held for some time, fulfilling its duties in an effective manner.

Photography had at that time begun to attract the attention of chemists, and when, afterwards, Mr. Spencer carried on his father's business of chemist and druggist, special prominence was given to the requirements connected with the new-born art-science. It was in 1852 that he may be said to have first given serious attention to photography, and he soon excelled in the copying of pictures and engravings. In 1856 the Arundel Society issued Mr. M. Digby Wyatt's *Notices of Sculpture in Ivory*, and for this work Mr. Spencer produced the photographic illustrations. It was at this period he threw his whole energies into the manufacture of albumenised paper at Shepherd's Bush, and to which he attached, for some time, a department for photographic printing.

Few, even among the devoters of photography, have any idea of the enormous trade in the manufacture and sale of albumenised paper which was carried on by Mr. Spencer. The statistics in connection with the consumption of eggs alone are curious. The sole occupation of two girls consisted in breaking the shells of the eggs employed in albumenising. In one year alone Mr. Spencer used up 247,000 eggs, selling in twelve months as much as 1,200 reams of albumenised paper, which was used not only in this country but exported largely to France, Germany, America, and China. This was more than ten years ago. During his career as a manufacturer of albumenised paper Mr. Spencer introduced several improvements in its preparation, one of which is well known to have been the rolling or pressing of the paper upon silvered plates. "Spencer's paper" was known all over the world on account of its purity and excellence.

Having been one of the first to recognise the importance of carbon printing, Mr. Spencer, at an early stage of the history of this department of photography, devoted himself assiduously to it, both as regards the manufacture of carbon tissue and the production of permanent prints. He then disposed of his albumenised paper business, and having become a member of the firm composing the Autotype Company, he confined his attention exclusively to carbon printing, believing that in it lay the great future of photographic printing. He continued in harness until about a year since, when he retired from active participation in the management of the Company's business, although his interest in everything relating to carbon was unflagging till his decease.

He was one of the first hundred who responded to the call for the formation of the South Middlesex Rifle Volunteers, in which he attained the rank of captain. In this regiment he was considered one of the best shots and most efficient of its officers. The last time he was out—now two months ago—was in connection with his military duties. He was confined to his bed the following day, and gradually sank under the exhaustion consequent upon the rapid development of a fatal disease, the nature of which even then was unsuspected, namely, a cancerous formation at the bottom of the gullet, which rendered the transmission of food to the stomach impossible. To this disease he succumbed at half-past one o'clock on the morning of Saturday last.

When we saw him during his confinement to bed—which privilege we enjoyed more than once—he spoke with calm and cheerful resignation of the probable issue of his illness; and on the occasion of our last visit he expressed the great interest he felt in the recent communication to the Photographic Society of Great Britain by his friend Dr. Monckhoven, his regret at not having been able to attend the meeting to take part in the discussion, and his conviction that he would not be present at another meeting—a conviction at that time shared by his friends.

His brother officers were desirous that he should be buried with military honours, but, in compliance with his expressed desire that his obsequies should be conducted as privately as possible, Mrs. Spencer declined the kind offer; nevertheless his funeral was largely attended by the members of his regiment. His remains repose in Hammersmith cemetery.

Of a kind, cheery, and loving nature the late Mr. Spencer, as we have already said, attracted and retained a large circle of devoted friends, and no man connected with our art-science has left behind more pleasant memories.

"A HYBRID PROCESS."

For some time past I have been devoting my attention to various organic preservatives for washed emulsion plates, and have used albumen in various ways with most encouraging success.

Oddly enough, last week I was trying the coagulation of the albumen by means of hot water, and on receipt of my Journal could hardly forbear smiling on reading your article on a *Hybrid Process*, in which you describe your own success with a similar method. I write now to record a curious bit of experience as regards the sensitiveness of the plates as affected by the preservative coating.

In your article you say you did not find any difference in sensitiveness between the plain washed emulsion and the same coated with albumen. With several of the emulsions I have used I have to say the same; but in two instances a very marked difference was produced by the albumen.

The first was with a commercial emulsion, giving a good plate with a fair degree of sensitiveness. With this one the treatment with albumen lowered the sensibility of the film one-third. In the other instance the sensitiveness was *greatly increased*, the albumenised film requiring only half the exposure needed for the same emulsion used without any preservative; and the most curious thing of all is that there appeared to be no difference in sensibility between the *two* albumenised films! But to make the statement clearer I will put it in another way. Emulsion A required an exposure of ten seconds. When coated with albumen it needed fifteen to produce as much detail. Emulsion B required thirty seconds to obtain a similar result; but when treated with the preservative fifteen seconds gave as fully exposed a negative! Another point worthy of note is that both these emulsions gave a better *quality* of image when treated with the preservative than without it, and emulsion B gave the better negative of the two albumenised ones. This emulsion B is prepared by a formula which I hope soon to publish, as it seems to me to offer sundry advantages over all the other formulæ I have tried.

I very much wish I could endorse your remark that there is no disadvantage to counterbalance the exceedingly great advantages of the simple washed emulsion processes. With many of these emulsions it is easy enough to produce a good, clean negative if the plate be used immediately after preparation; but, down here at least, it appears impossible to get a negative free from spots and other markings if the plate have been kept for even a few days.

I am conceited enough to think myself not quite a "duffer" at emulsion work, and it is with sorrow I have to confess my want of success. I was almost beginning to think that the time and money I had spent over my hundreds of experiments were, after all, thrown away, until I began to use organic preservatives with the washed emulsion films. I am now in a more cheerful frame of mind, and really hope I am on the road to obtaining a thoroughly-reliable and easily-prepared plate.

I recently exposed and developed some emulsion plates which had been kept for seven years in an ordinary plate box, and they were certainly quite as good as when first prepared. The emulsion had a small amount of soluble bromide present in it. The coated plate was soaked in water for an hour, and then for one minute in a mixture of salicine, gallic acid, and sugar. If we ever get a simple washed emulsion to give a plate with keeping properties like this I, for one, should certainly rejoice. HENRY COOPER.

THE PHOTOGRAPHIC PRINTING PROCESS USED IN THE PORTUGUESE STATE PRINTING ESTABLISHMENT.

I.—THE PRODUCTION OF PHOTOGRAPHIC NEGATIVES FROM LINE ENGRAVINGS.

Here, as everywhere else, simplicity is the first condition of success in an operation. In spite of the numerous formulæ for collodions and for silver and gold baths that are published from time to time, there are but few that prove suited for use in the daily practice of a large establishment, especially when a certain amount of work has to be produced by certain rules and in a given time.

In the case of reproductions of line engravings without half-tones the ground of the negative must be perfectly opaque, while the lines, on the contrary, must be perfectly transparent. But few operators are able to produce work fulfilling these conditions, and yet by the want of such a negative the whole result to be produced by photolithography or heliography is placed in jeopardy. We proceed in the way hereafter described.

Two baths serve to clean the plate glass, viz., a dilute solution of caustic soda, used to remove fatty and resinous particles, and a mixture of an aqueous solution of bichromate of potassium and sulphuric acid to remove all other impurities. The plates are then well washed and wiped dry with a linen rag, the last traces of impurity being rubbed off with a little whiting and spirit of wine.

The collodion is prepared in quantities of from ten to fifteen litres, and when iodised with iodide of cadmium it keeps usable for months, but is only suited for copying line engravings without half-tones.

The silver bath is slightly acidulated with nitric acid. For large plates ebonite dishes with lids are used. After being exposed in the apparatus the plate has at once as much pyrogallic acid developer poured over it as is sufficient to cover it wholly; it is then placed upon a level stand adjusted by three screws. A fresh supply of pyrogallic developer, to which a few drops of a four-per-cent. silver solution has been added, is then poured on, and by gentle movements is made to flow backwards and forwards until the negative is developed equally and powerfully all over.

The manipulator washes, fixes with a saturated solution of soda, washes again very carefully, and then pours on a saturated solution of chloride of mercury, which is allowed to act until the whole film has become white. Now follows more washing, and then a coating of a very dilute solution of cyanide of potassium, which blackens the film.

If the proper time for the exposure has been hit the result will be perfect; if not, one can still strengthen with silver and pyro. after blackening with cyanide of potassium and washing the film.

The varnish is of a peculiar composition.

Positive *clichés* for copperplate heliography are produced by tannin plates with an acid developer. Most of the negatives are (either before or after being printed from) drawn off the glass by means of gelatine containing glycerine, and are stored between flat sheets of pasteboard.

FORMULÆ.

Collodion Cotton.

Sulphuric acid of 66°	550 grammes.
Nitric acid of 1·4 sp. gr.	256 ,,
Cotton wool in a very dilute solution of caustic soda, washed, and well dried	20 ,,
Temperature of the water bath	60° C.
Duration of immersion	7 minutes.

Collodion for Linear Drawings.

Alcohol of 40° C.	500 c.c.
Ether of 65°	500 ,,
Collodion cotton	11 grammes.
Iodide of cadmium	6 ,,
Iodide of ammonium	5 ,,
Bromide of ammonium	2 ,,

Developer.

A.

Distilled water	1 litre.
Glacial acetic acid	20 grammes.

B.

Pyrogallic acid	100 grammes.
Alcohol of 98°	1 litre.

Mixture, one litre of A and 50 c.c. B.

Fixing Bath.—A saturated solution of hyposulphite of soda with a few drops of ammonia. Must be prepared a few days before use.

Varnish.—(A very hard varnish resisting heat, to be poured on warm):—

Alcohol of 95°	4 litres.
Yellow shellac	360 grammes.
Oil of lavender	100 ,,
Turpentine	80 ,,

Varnish.—A varnish for alcoholic collodion, to be prepared with very soluble cotton:—

Alcohol of 90°	6 litres.
Gum elemi	80 grammes.
Benzole	240 ,,
Yellow shellac	240 ,,
White ,,	120 ,,
Turpentine	160 ,,

II.—POSITIVE CLICHÉS PREPARED FOR HELIOGRAVURE BY THE DRAUGHTSMAN.

By this very simple process the production of photographic negatives is avoided, and by it very successful heliogravures are produced.

A sheet of ground glass, which has been lightly rubbed with linen rags and powdered sandarac, and then carefully freed from the superfluous resinous powder, serves as the foundation. The draughtsman draws upon this with Chinese ink rubbed down in water and mixed with a little sugar and glycerine, so as to render the drawing a little sticky. When one dusts fine graphite powder upon the finished and as dry as possible drawing, and then rubs it very gently in with cotton wool, a very dense effect is produced. To protect a *cliché* so obtained from injury by damp or friction coat it with negative varnish, which renders the glass transparent.

Under such a *cliché* a copper plate, coated with chromated gelatine or asphalte, is exposed to the light; the etching is done by the formula given hereafter. From a *cliché* of this sort a photographic negative can also easily be produced.

III.—ARTISTIC NEGATIVES FOR PHOTOLITHOGRAPHY AND HELIOGRAVURE.

Upon a sheet of well-polished plate glass spread a film consisting of—

Gelatine	8 to 10 grammes,
Water	100 ,,

to which has been added as much plumbic carbonate as to render the mixture doughy in consistency. The lead salt must be extremely fine and free from granularity. The mixture should be rubbed for a few minutes upon a palette, and then spread with a pencil equally over the surface of the glass, so as to leave no transparent nor apparently transparent places. This film may be dried either in air or by a gentle heat.

The plate is laid upon black paper, and the drawing, which has previously been transferred to the film by tracing paper, is etched with a needle. To retouch one uses a pencil and white colour.

When the film has been freed from the dust raised by the needle the plate is dipped into a solution of sulphuric hydrate, where the white is changed to a deep yellow. The plate is then dried at a gentle heat, and varnished with negative varnish.

The negative is reversed, as is required by the direct typographic photo-engraving process.

By printing, one above the other, several such negatives, whether produced by hand or by machinery, combinations may be obtained which would be very difficult to imitate, and which might be useful in the preparation of papers of value, and so on.

—*Archiv.* JOSÉ JULIO RODRIGUES.

(To be continued.)

OUR APPARATUS.

No. IV.

DARK ROOMS.

THE dark room, or, more correctly speaking, the laboratory, although it can scarcely be called apparatus, is still so intimately connected with the paraphernalia of the photographer that a few remarks will not be altogether out of place. This apartment should be roomy and well ventilated, with no more shelves, bottles, and apparatus in it than are absolutely requisite. The walls and woodwork should be smooth, to prevent accumulation of dust as much as possible, and so that it can be more easily removed if it do accumulate. A good varnished paper over both walls and ceiling is very suitable. Glazed tiles might even be better, but the varnished paper answers every purpose at a much less cost.

The floor ought to be of brick, stone, or asphalte, with a plank raised a couple of inches above it for the operator to stand upon. The window should be sufficiently large to well illuminate the room; for nothing is more trying to the eyes than to go direct from the glass room into the dark room to develope a plate, and if the window of it be very small and glazed with the usual ruby or deep orange glass it is almost impossible to see what you are doing, and the risk of breakage is vastly increased. For this reason have plenty of light of the right kind, and on a level with your hands—not raised much above the head, as I have occasionally seen it in otherwise convenient laboratories, for this position is very inconvenient to examine plates during development, they having to be raised so high that the solutions run down the hands and sleeves, and make the operator in a very dirty state, besides increase the chance of unequal development, which with a low window may be entirely avoided.

No direct sunlight should fall on this window; but if, owing to the structural conditions of the premises, it cannot be avoided, a screen should be adjusted to protect it. Diffused light is much more pleasant to work by than that transmitted through clear glass; tracing paper, ground glass, or some similar substance may be used to effect this purpose. A constant supply of clean water is very important from a cistern sufficiently elevated to give a fair degree of pressure at the taps, which should be small. A fine rose, made so that it can be easily attached, is very useful for washing large plates; but for small work the stream from the tap is, I think, rather preferable.

The sink should be divided into two portions—one to receive the developing and other solutions rich in silver; and the other for completing the washing of the plates, &c. A thick curtain should fall over the outside of the door to protect the room from the accidental admission of white light during ingress and egress, unless the position of the door is such as not to require it. A fastening on the inside is a good precaution. The laboratory should, in fact, be a well-ventilated, properly-lighted, dust-free, private apartment, and used only for the purpose for which it was constructed, bearing, as it does, the same relation to the rest of the photographic premises as the kitchen does to the dwelling-house. Insufficient space or accommodation is, in either case, fraught with disagreeable consequences. Fragile things are jumbled one on the other, everything being in the way of everything else, and the semi-obscurity conducing to breakage and waste.

Breakage, by the bye, forms a considerable item in many establishments, and photographers' assistants have a reputation for carelessness; but I think they should have more allowance made than is generally accorded to them by reason of the gloom and obscurity they so often have to work in. This, combined with a general untidiness—there being a proper place for everything but nothing in its place, or in the same place twice together—still further augments the chance of breakage, and it may be fairly inferred that if premises are kept neatly and in good order loss from breakage and waste will be a minimum. But I am digressing.

Tents

for travelling or outdoor work come again under the legitimate title of apparatus, and a very important part of the apparatus they are. Their forms are legion. Scarcely a season passes without some new design being introduced to our notice. The particular kind may be selected according to the work intended. Whether it be of a heavy or light make, or whether put up for work with the rapidity of an act of legerdemain or to occupy some twenty minutes or so, will depend upon the work required. All should be as commodious as possible to be conveniently managed. Work—and good work, too—*can* be done in cramped-up spaces; but a commodious, well-ventilated tent is not only conducive to good work but also to health and comfort.

If the tent can be carried in a vehicle and fixed up for the day in one place nothing can be better than the old-fashioned pattern. With a wooden tray, a jointed frame, and a light-tight bag to pull over it, a tent is thus made that can be thrown open at will and all the contaminated air dispersed. It stands or is fixed firmly on to a box designed to carry the chemicals, &c., and is independent of any wind and most rough treatment; but if, however, the tent has to be carried by hand, some smaller and lighter form must be used. There are several in the market that answer the purpose remarkably well. Those designated "Edwards' pattern" are as good as any. The three points to be particularly looked to are that the ventilation is good, that there is plenty of space for work, and that it is easily made light-tight during use. If these conditions are fulfilled the tent will answer its purpose whatever kind it may be.

For working dry plates, or, I should rather say, for changing them, an exceedingly light tent or bag may be used. A folding board to which a bag of light-tight material is attached, with sleeve holes secured with elastic bands and of sufficient size for the plates intended to be worked, is a very simple and effective design.

The changing-boxes, again, are very useful. In this case only one size of plate can be used, but with the bags any size can. A tent folding like a chess board, opening square with a light framework over which a bag is drawn, and working through sleeve holes, is a useful form, as it is suitable for developing in addition to merely changing the plates; and for those photographers who wish to see what they have taken on the spot it offers many advantages, being a sort of compromise between the regular tent and changing-bag. It is so light that the photographer may carry it without other assistance in addition to his camera and tripod. Where it is practicable I would always advise the photographer to have some one to carry his apparatus if it exceed five or six pounds' weight, and he has a picturesque country to travel through (for, as a rule, the more picturesque the more fatiguing). He will then be in a better condition, both physically and mentally, to do good work.

Syphons,

for emptying a large bath-holder, &c., are readily made by connecting two pieces of glass tubing with india-rubber tube, and lengthening the long leg with the same. They are more serviceable and not so easily broken as when made of one long bent glass tube, which will snap asunder with a very trifling strain.

Conical-shaped Graduated Glass Measures

are better than cylindrical for the measurement of any quantity less than half-a-pint, and should be selected made of clear, thinnest glass with a heavy foot, accuracy of measurement being interfered with if measures of a clumsy construction are used—that is, of very thick, wavy glass, as often supplied. Glass bottles containing solutions that are frequently used should have lips and not thick rims, it being very difficult to pour small quantities of liquid from thick-rimmed bottles without waste. Glass stoppers are prevented from sticking by being rubbed with a piece of white wax; the rim of the bottle being rubbed in the same manner facilitates pouring.

E. Dunmore.

THE REACTIONS OF CHROMIC ACID AND CHROMATES UPON SUBSTANCES OF ORGANIC ORIGIN, CONSIDERED WITH REFERENCE TO THEIR USES IN PHOTOGRAPHY.*

The addition of acetic acid to gelatine for chromate photography has sometimes been prescribed, notably by Pretsch,[1] Leipold,[2] and Scamoni[3] in photogalvanography.[4] As gelatines to which acetic acid has been added do not stiffen they are quite useless for many purposes—for example, for lichtdruck and the preparation of pigment tissue—as they run off the support.

Gelatine dissolves in acetic acid as gum arabic does in water, so that it is quite believable that carbon pictures can be developed cold with acetic acid, because the unacted-upon glue dissolves at once. Liesegang[5] remarked that years ago. Dilute muriatic acid, sulphuric acid, and oxalic acid have also the same effect. They dissolve the glue without decomposing it, and, added in a very small quantity to water, they effect the solution of the glue while cold. Pigment pictures are developed by dilute acids at an ordinary temperature more slowly, harder, and not so fine as with warm water, therefore the latter is generally preferred. Mumler[6] developes photographic gelatine plates for *Typendruck* cold with acetic acid, because the otherwise usual warm water penetrates and softens the exposed gelatine, and thus causes distortion and swelling.

The behaviour of concentrated gelatine solutions with salts is interesting. Potassic and sodic carbonate, magnesic sulphate, and seignette salts make the gelatine solutions curdle. Alum only precipitates gelatine solutions rich in chondrin, but it also makes those rich in glutin tough and easily stiffened. The same thing was also remarked by Fleck,[7] according to whom sulphates, but not chlorides nor nitrates, generally separate the glue from the solvent.

Caustic potash and soda dissolve glue, much quicker cold than warm, as a brown liquid with decomposition of the glue. Ammonia acts but slightly as a solvent.

The aqueous solutions of glue become putrid very soon, when the jelly becomes fluid and smells of ammonia. At a temperature of from 25° to 30° C. the putrescence often commences in forty-eight hours, or even in twenty-four hours. Carbolic[8] acid added in small quantities prevents this putrescence, and may for that purpose be added with advantage to photographic gelatine, when, in consequence of slow drying or other tedious operations, one has reason to fear a watery solution becoming bad. Large quantities of carbolic acid[9] precipitate the glue from its solutions. Chromate gelatine films, which in the dark room become insoluble of themselves[10] on account of a spontaneous reduction of the chromic acid, cannot be preserved by an addition of carbolic acid. Calvert[11] thought to increase the stability of dry chromate gelatine by this addition; but it was quite useless, as the carbolic acid only prevents the decomposition of gelatine by putrescence. If Fridlein[12] adds a little carbolic acid to the gelatine solution, so that it shall not come into photographic use in a putrid condition, it is appropriate and effective; but it does not help to preserve the sensitiveness of the chromated paper any longer, and therefore I consider the addition of carbolic acid to the chromate bath for pigment tissue rather purposeless.

Salicic[13] acid is also recommended for the same end as a preservative against decay; and solutions of glue to which it has been added keep long and dry quicker than the pure gelatine.[14] Alum also acts as an antiseptic, and is added during the manufacture of glue, in order to prevent it from becoming putrid while drying during bad weather.[15] As a constituent of commercial gelatine I have not found alum in any quantity. Glycerine,[16] when added in great quantity, increases the keeping qualities of glue, as takes place in the manufacture of printing

* Continued from page 162.

1 *Journal für Buchdrucker*, 1856, p. 225.
2 *Photo. Correspondenz*, vol. xi., p. 153.
3 *Handbuch d. Heliography*, 1872, p. 76.
4 *On the Influence of Acetic Acid in Chromate Photography.*
5 *Phot. Archiv*, vol. xi., p. 33.
6 *Phot. Archiv*, vol. xix., p. 32.
7 *Dingler's Polytec. Jour.*, vol. cci., p. 364.
8 Osterr. *Vereinszeitschr*, 1868, p. 477.
9 Graham. *Annales Pharm.*, vol. cxxi., p. 1.
10 Graham. *Annales Pharm.*, vol. cxxi., p. 1.
11 *Phot. Arch.*, vol. v., p. 118.
12 *Phot. Monatsblätter*, vol. i., pp. 150, 166. *Phot. Correspondenz*, vol. xiii., p. 282.
13 Wagner. *Jahrber*, 1875, p. 916. Stillman. *Phot. News*, 1875, p. 80.
14 *Phot. Monahobl.*, vol. i., p. 176.
15 Muspratt. *Chem.*, third ed., vol. iv., p. 366.
16 Lallement. *Dingl, Polyt. Jour.*, vol. cxliii., p. 380.

rollers of glue and glycerine.[1] Lanjorrois's recommendations[2] to preserve the gelatine from decay by an addition of one per cent. of fuchsine is not to be done with good results in chromate photography. Potassic bichromate forms, with fuchsine, rosaniline chromate, which is almost insoluble;[3] and the latter renders the whole chromate gelatine difficult of solution, so that there is great difficulty in developing a picture. The addition of zincic chloride should, according to Meritens and Kresser,[4] increase the stability of gelatine by hindering decay, and should also give more beautiful whites to lichtdruck plates. The addition of one per cent. of chloral hydrate to glue or albumen prevents decomposition for a long time.[5]

Gelatine which has already begun to decay cannot be used for producing photographic pictures, because it has lost all stability and consistency, and, besides, potassic bichromate will render it insoluble in an extraordinarily short time.

Behaviour of Chromic Hydrate and Chromates with Gelatines.

Chromic hydrate forms with glue a coagulated mass, which dissolves on being heated.[6] A lukewarm solution of glue, saturated with potassic bichromate, does not, according to Hylten-Cavallius,[7] gelatinise when it cools. This statement should be cut down to this—that bichromate of potassium certainly delays, but does not prevent, it from gelatinising. The monochromate of potassium behaves in the same way, and so do the chromates of sodium and ammonium. If a gelatine solution to which chromic hydrate has been added be dried in the dark the glue will no longer dissolve in hot water, and its property of swelling up in cold water will also be partially lost. A bichromate solution acidified with sulphuric acid acts in the same way.[8] Bichromated and monochromated gelatine do not change their properties after being dried in the dark; they still remain soluble in warm water. Potassic trichromate, got by evaporating potassic bichromate with nitric acid or chromic[9] hydrate, behaves like a mixture of chromic hydrate and potassic bichromate; that is, it imparts to the gelatine the property of insolubility in hot water without entirely depriving it of its power of swelling in water.

Gelatine containing potassic bichromate, on drying, if it be not present in excess, dries in and forms a transparent film without crystallisation. If the exact points be exceeded, and too much potassic bichromate be added, the salt will crystallise out as *dendrites*, and the film will no longer be of any use for photographic purposes. It seems to be of no little importance to chromate photography to determine the maximum bichromate contents which gelatine can retain without allowing the salt to crystallise out, since amongst its pretensions is that by its means the greatest possible quantity of a salt of chromium can be incorporated with gelatine. I found that all sorts of gelatine had not the same capacity for receiving potassic bichromate, but that, generally speaking, those sorts which absorb most water could also take up most chromium salt. A comparative experiment showed me that good gelatine which could take up from six to ten times its weight in cold water can, as a rule, hold as a maximum from 0·3 to 0·4 parts by weight of chromate without any of it being thrown off by crystallisation after drying, while the inferior sorts, which only absorb from three to six times their weight in water, can only take up about 0·2 parts by weight of chromate. Many kinds of gelatine are decomposed by soaking for twenty-four hours in water of 15° C. Such inferior qualities cannot retain even the addition of 0·2 parts by weight of chromate. These statements hold good for chrome gelatine films upon glass left to dry spontaneously in air at a temperature of from 20° to 25° C. Under the same conditions more ammonium bichromate than potassium bichromate can be added, apparently because the first is much more soluble[10] than the latter, and less apt to crystallise out. From one-third to one-quarter more of the ammonium than of the potassium bichromate can be added to the gelatine, the action of the former being also more favourable than that of the latter. If, however, the chromated gelatine poured upon glass be dried at a temperature of from 40° to 50° C., and in a good current of air, about twice the maximum quantity of potassium bichromate mentioned above can be added to the gelatine without fear of its crystallising out. Such are the favourable effects of rapid drying at a high temperature. This property of the ammonium salt is of importance in the printing process, where one often wishes to introduce as much chromate as possible.

The behaviour of these salts is quite different when the chromated gelatine is placed upon paper. Paper, on account of its porosity, absorbs so much of the solution of a salt of chromium, and thus deprives the gelatine of a part of its chromate; at the same time the evaporation of the water is accelerated. When a mixture of gelatine with potassium bichromate is poured upon paper the proportion of the bichromate to the gelatine may be increased to about 0·6 or 0·7 parts by weight without fear of the formation of *dentrites*.

I may also mention in this place that I did not find it profitable to add to the dry gelatine less than 0·1 part of its weight of potassium bichromate, else the sensitiveness of the chromated gelatine would become very slight indeed, and only weak pictures could be obtained. From this it is evident that the proportions in which chromates may advantageously be added to gelatine are not very comprehensive, though it is superfluous to ascertain the exact limit by weight of the proportionate quantity. J. M. Eder, M.D.

(To be continued.)

[1] Schaarwächter. *Phot. Correspondenz*, vol. viii., p. 14. *Polytect. Notizblatt*, 1871, No. 8. (Made of glue and syrup 3 : 1, and rubbed with a solution of tannin.)

[2] *Dingler's Polyt. Jour.*, vol. ccvii., p. 575. *Phot. News*, 1873, p. 587.

[3] Kekulé. *Benzol derivate*, 1867, p. 187.

[4] *Bulletin Phot. Soc. Franc.*, 1874, p. 309.

[5] *Phot. News*, 1873, p. 468. *Phot. Archiv*, vol. xv., p. 162.

[6] Hünefeld. *Jour. Pract. Chem.*, vol. ix., p. 30.

[7] Muspratt. *Chemie*, vol. iv., p. 350.

[8] Muspratt *On Behaviour of the Acid Chromate Bath.*

[9] *Fehling's Neues Handw. de Chemie*, vol. ii., p. 677.

[10] See Davanne's *Table of Solubilities.* *Bulletin Phot. Soc. Franc.*, 1869, p. 94. *Phot. Corr.*, vol. vi., p. 160.

TRANSATLANTIC NOTES: THE VOYAGE.

I have left the north for a time to look after itself, and, taking advantage of an opportunity of renewing my acquaintance with the "new world," find myself on board one of the American liners, going as fast as wind and steam will carry us towards the American shores. Once landed there I mean to wander hither and thither as far as time will permit, and, with the Editors' leave, intend to tell my readers as much as possible of whatever interests me in matters relating to photography, in the hope that such jottings may also interest them.

We have many passengers—how many, indeed, I cannot say, as I've not yet been able to count them, sickness having hitherto kept numbers confined to their berths, as is evidenced by the appearance of new faces day by day. They are a motley crew. I don't, of course, apply the term in a disrespectful sense, as, so far as appearance goes, the respectability of the party is unquestionable, but to convey an idea of the variety, both national and characteristic. There are Dutchmen, heavy both mentally and bodily; Frenchmen, lithe and voluble; Italians, swarthy and reticent; Danes, with thick wooden-soled shoes to keep the wet from their feet, and huge pipes which must keep both hands and face warm; even Bulgarians, or rather a Bulgarian, but he cannot speak a word of English, and keeps himself and his peculiarities to himself; Englishmen, Scotchmen, and Irishmen, and, better still, Irishwomen, who are the life of the party, and ever ready for any amount of singing and dancing, and even a little mild flirtation. Varied, however, as are the nationalities, and, consequently, the manners, customs, and characteristics of the passengers, they agree in one thing, namely, the interest they take in photography on board, and the desire manifested by one and all to be photographed.

"One touch of nature makes the whole world kin."

That "touch of nature" is the universal desire shown by all classes to see themselves in a picture, or even to stand in such a position when a picture is being taken as to be sure they are in, even although they may have no expectation of ever seeing it.

My camera is with me, of course, and I've been at it "tooth and nail" almost constantly since leaving the Mersey; but I do not find it the plain sailing that the published experiences of some of our friends had led me to expect. The captain and officers—no exception to the rule—in their interest in our art most kindly afforded me every facility for carrying on the operations, and the bath-room being placed at my disposal, with a plentiful supply of water laid on, I soon got a contrivance rigged up whereby bath and bottles were suspended so as to swing freely and be always kept on the level. This, however, turned out to have been labour in vain, as the passage hitherto has been so quiet that the bottles stand on a shelf as securely as if in my laboratory at home, and the bath finds a most suitable resting-place in the wash-hand basin.

Pictures of the well-lighted saloon and of the deck and its appliances are easily obtained with all the sharpness and definition of objects at rest, as, although the ship may pitch or roll, or, what is more likely and more generally the case, do both at once, the tripod with its burden moves at the same rate and through a like distance. But it is altogether different when we include in the view animated objects. A "calm sea," on the Atlantic ocean at least, is not so placid as Loch Katrine, but always undulates sufficiently to give considerable motion to the vessel. There being in human nature an instinctive desire to keep straight—that is, to retain the true perpendicular—there is an involuntary but constant adjustment and readjustment of the body, with an effect the very opposite of what too frequently takes place in the studio on *terra firma*, where the sitter moves while the camera is steady; that is, the sitter by his adjustive motion gets the equivalent of being steady, while the camera is in constant motion. Under such circumstances short exposures are absolutely essential, and I am sorry to say that my chemicals (having had to start at an hour's notice a week earlier than I expected), even after ransacking the medicine chest for the means of improving them, are not sensitive enough for the work. But, fortunately, having brought with me a batch of matts and preservers—a remnant of the old positive days—and finding in the aforesaid medicine chest material for a proto-nitrate developer, I have produced several dozens of "framed positives" that have gladdened the hearts of as many of my fellow-passengers.

Positives, however—all very well in their way—become monotonous, and as there was a general desire for groups, copies of which might be sent home, I bethought me of some gelatine plates that had been brought for another purpose, and on trial they proved more sensitive than the wet collodion, and two or three days were pleasantly spent in securing more than passable negatives of groups varying from two to forty-nine sitters. The party included several amateur photographers, and, having a supply of sensitive paper, they gladly undertook the printing, and the result now lies before me in a pile of *cartes de visite* lacking only the smooth surface given by the roller or burnisher; and this want will soon be supplied, as the obliging chief engineer is busy at work extemporising a piece of apparatus that he assures me "will make them shine like a looking-glass."

Now here follows the moral of this long story, and photographers of a money-making turn of mind and with a spare couple of months on hand will do well to listen to it. Passengers from Europe to America have generally eight or ten days that hang somewhat heavily on their hands; they are easily interested in photography, and nothing pleases them so well as to sit singly or in groups, or both, except perhaps getting copies of the pictures so taken *before the day of landing*. They have generally a good many spare shillings in their pockets, and they part with them all the more readily from the feeling that they will be of no use to them in the place to which they are going without the bother of negotiating an exchange. These being the conditions, the aforesaid photographer of a money-making turn of mind will not be "worth his salt" if he cannot manage to do a stroke of business that will not only cover the expense of his two months' holiday, but also leave a not inconsiderable balance.

If my little experience be of any use to him here it is. Let him, first of all, secure the goodwill of the captain, then make friends with the chief engineer, who will be found his "friend in need" in all possible emergencies, and also let him get into favour with the steward. The last-named may be open to a mild "tip," but is easily satisfied, and when so will do much to make the work comfortable. There should be included a small water-tight bath with solution in good working order, a reasonable supply of concentrated developer with other chemicals to match, a tolerably good supply of sensitive paper, toning and fixing solutions, and half-a-dozen printing-frames, with, perhaps, a burnisher also, as every engineer may not be so willing to rig up a substitute as is my friend of the present voyage. The photographer need not fear to go single-handed, as there will generally be found amongst the passengers several amateurs willing to undertake a share of the work, but, failing that, the doctor may always be relied upon as easily taught and eager for the work. JOHN NICOL, Ph.D.

FOREIGN NOTES AND NEWS.

COPPER PRINTING PLATES PRODUCED FROM PHOTOGRAPHIC *CLICHÉS*.—HOW OIL PAINTINGS ARE PHOTOGRAPHED AT MM. GOUPIL'S ESTABLISHMENT AT ASNIÈRES.—ENGRAVING BY ELECTRICITY.—PHOTOGRAPHY BY ELECTRIC LIGHT.

THE *Wochenblatt* quotes from the *American Mechanics' Magazine* the following process for getting printing plates on copper from a photographic negative. The description is short and simple :—

"Take a perfectly clean and polished copper plate, and dip it for thirty seconds in a bath consisting of—

Sulphate of copper	125 grains,
Chloride of sodium	75 ,,
Water	2 ounces,

and slightly acidulated with any acid. As soon as the plate is taken out of the bath it should be well washed, and dried with a fine cloth. It is then ready to be placed under a negative and exposed. When the sunlight is good an exposure of from five to ten minutes will be sufficient. The plate is now dipped into a silver bath only to fix it. In a few seconds those parts of the drawing which were red will become white, and the violet shadows will gradually change to black. As soon as the shadows have become black the plate should be taken out of the silver bath, well washed, and then dried over a spirit lamp. As the black colouring matter is in the form of powder the plate must be varnished in order to preserve the drawing. If, however, the plate is intended to be etched, after it has been dried over the spirit lamp, its back and edges only should be varnished, but the varnish must not pass over the drawing. The black dust which forms the shadows of the drawing should then be carefully removed and the plate rinsed under a strong stream of water, and, while yet damp, it should be dipped into the etching fluid. A good medium is made by—

Nitric acid	1 part.
Saturated solution of potassic chromate	2 parts.
Water	5 ,,

If the black powder be not removed, and an etching medium formed of iodine and potassic chromate or nitric acid be used, the result will be a plate in relief."

A correspondent of the same journal gives the following description, from personal observation, of the way in which photographic reproductions of oil paintings are made at MM. Goupil's establishment at Asnières :—

"New oil paintings are laid perfectly flat upon a table, and then receive the thinnest possible coating of white of egg, well beaten up, laid on with a broad beaver brush; while old or very dark pictures, or such as have matt spots, are rubbed with glycerine to bring out the details. The photograph is usually taken in the open air, on a wide terrace or in a large courtyard, and large pictures are surrounded by large screens, made of a light wood, with dark calico stretched across, in order to keep off all reflected light. An opening is made in one of the screens, which is placed exactly opposite the picture, through which the lens—a very actinic Hermagis—may be pushed. Pictures with clear skies are canted a little forward towards the lens, or else they are turned upside down. When the picture possesses very little actinic colour it must be exposed from four to seven minutes. The collodion used, which is extremely sensitive, consists of iodide of potassium (ground very fine), iodide of cadmium, bromide of zinc, and bromide of ammonium. The silver bath consists of—

Nitrate of silver	7 grammes.
Distilled water	100 ,,
Crystallised nitrate of zinc	3 ,,

In winter there is no zinc, but then there ought to be eight grammes of silver. M. Quinet himself sensitises the large plates with eminent skill. The negatives are seldom retouched, and even in the most difficult cases as little retouch as possible is put on."

According to *Les Comptes Rendus* M. G. Planté has discovered a convenient method of engraving upon glass by means of electricity, which he describes as follows :—"Cover the upper surface of a plate of glass or crystal with a concentrated solution of potassic nitrate by simply pouring the liquid upon a plate previously levelled upon a table or in a shallow trough. Then dip into the fluid which covers the glass, and draw along the edges of the plate a horizontal platinum wire communicating with one of the poles of a secondary battery of from fifty to sixty elements; the other electrode—which consists of a platinum wire covered to the tip with an isolating envelope—is held in the hand and is brought into contact with the parts of the glass covered by the thin salt-solution film where it is desired to draw a letter or a design. Wherever the electrode comes in contact with the glass it makes a shining furrow, and these are more or less sharply engraved into the glass according to the rapidity with which the strokes were drawn or written. When one draws or writes slowly the strokes are deeply engraved, and their width depends upon the thickness of the wire used for the electrode; when the latter is cut to a sharp point the lines may be very fine and delicate. One may engrave with either electrode, but a stronger current is required when the negative pole is used. Though I have obtained these results when using a secondary battery, it is evident that in order to make continuous work possible every other source of electricity must be available, if its quantity and extent be sufficient; so that a Bunsen's column with many elements may be used as well as a Gramme's machine, and even an electro-magnetic machine with alternately negative and positive currents."

In the *Monatsblätter* Herr Baumann, of Cologne, says that after hearing of the portraits taken by electric light he developed electric light himself from a Gramme's machine. To that light he exposed a photometer for fifteen minutes, and found that it had printed up to between the ninth and tenth degrees, and the same result was obtained by exposing a similar photometer the same day during the whole duration of daylight. On taking a photograph by electric light he found that with a globe lens an exposure of ten minutes, and with a three-inch portrait lens an exposure of a hundred seconds, was required. In both cases the shadows were bad and heavy, as no contrivance for concentrating or diffusing the light was at hand.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 1	Edinburgh	5, St. Andrew-square.
,, 1	Bristol & W. of England Amateur	Museum, Queen's-road.
,, 1	Benevolent Association	160a, Aldersgate-street.
,, 2	South London	John-street, Adelphi.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THIS Society held a *conversazione*, on the 29th ult., in the lesser City Hall,—Mr. John Stuart, President, presiding.

There was an attendance of about two hundred and thirty members and friends. Around the room there were numerous tables on which were displayed many scientific instruments neatly arranged, and which during the course of the evening were carefully examined by the company.

The microscopes, stereoscopes, polariscopes, &c., were supplied by Messrs. George Mason and Co.

A very fine electrical instrument for blasting purposes was exhibited by Mr. Nelson.

Mr. Smilie had a telephone connecting one room with another, which interested a large number of those present.

Mr. Parker exhibited one of Howard's tents.

Mr. Smithills exhibited a beautiful French-made camera with changing plate.

There were a number of songs well rendered by amateur friends; tea, fruit, and confectionery were well supplied and heartily enjoyed.

The PRESIDENT made a few characteristic remarks, commencing by saying that he had been requested by the committee not to exceed three or four minutes—a request he would comply with in order that as much time as possible might be devoted to the dancing which was to follow. After some general observations, in which he expressed the pleasure he experienced in seeing the assembled company and indulged in a few reminiscences of former times, he concluded by addressing the young members of the photographic profession as follows:—"Be diligent, careful, painstaking; learn all you can about your art-science; read up the literature on it; become proficient in every detail; and remember that although photography has made great advances during its short existence, there are still great things to be done by it. Photography is as yet only in its infancy, and before it there is a great future. I hope that such meetings as the present will help us to rub off some of the sharp corners which are apt to exist between those in the same trade when they do not come into social contact."

At the close of the meeting votes of thanks were heartily given to the committee who had managed the arrangements, to the amateur vocalists who had given their services, to those gentlemen who had supplied instruments, and to Mr. Stuart for presiding.

ANOTHER meeting of the same Society was held on Thursday, the 11th inst., in the Religious Institution Rooms,—Mr. John Urie in the chair.

The principal business was to receive a report from the *conversazione* committee, and to nominate office-bearers for next session.

One of the members then showed a large number of *carte* portraits taken in a studio having a southern exposure, and glazed with ground glass. They were very effective pictures.

In reply to a question how best to mount prints on thin paper so that they might not frill or draw the paper, "mounting medium" was spoken of, and a solution of india-rubber was also recommended. The following were, too, suggested:—To damp the paper, mount with starch, and dry under pressure. Again: to use gelatine that had been first soaked in water, and then dissolved in alcohol.

After a vote of thanks to the chairman the meeting was adjourned.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

THE Board of Management of the above Association met on Wednesday, the 3rd inst., at 160A, Aldersgate-street, when the following gentlemen were elected as ordinary members of the Association, namely, Messrs. Wratten, Reilly, and Marschall.

The other business of the evening having been completed, the meeting was adjourned to May 1st, at 8 p.m.

PHOTOGRAHIC SOCIETY IN BERLIN.

A MEETING of this Society was held on the 21st March,—Herr Brasch occupying the chair.

After the transaction of routine and private business a lively discussion arose on the radiometer, several members having revived the proposition of using it as a photometer by which to regulate their exposures. As some of those present were not acquainted with the radiometer,

Herr DÜBY described it and explained the principles upon which it is based, concluding by expressing his opinion that its adaptability for use as a photometer was of the slightest, as its rotation seems to be accelerated by heat as well as by light.

Herr FRANÇOIS CORNAND could not admit that, as a radiometer seen by him had ceased to turn when the sun's rays were intercepted by a screen.

Herr DÜBY pointed out that by preventing the sun's rays from falling on the instrument the heat of the place where the radiometer stood would also be sensibly diminished. The radiometer was also known to turn, though but slowly, in the dark when placed in the neighbourhood of some source of warmth, such as a stove.

Herr BLANDIEN asked how the radiometer's action compared with that of non-sensitive or but slightly sensitive preparations, and was thus considered to bring the whole question to the *reductio ad absurdum.*

Another member (whose name is not given) related that when he was in America he had heard it proposed in all seriousness that the strength of the light could be determined by the degree of dilatation or contraction of the pupils of the eye of the common house cat—a communication which occasioned great merriment.

Another lively debate arose on the question of the best colour for the dark room window, red glass being suggested for that purpose.

Herr DÜBY preferred orange-coloured glass, because it transmitted fewer blue rays than any of the samples of red glass he had yet seen. Certainly glass of a pure spectral red, he thought, would answer better than orange-coloured glass, but then it was questionable whether glass of a sufficiently pure red could be obtained; so that he (Herr Düby) believed that a combination of red and orange—or, in other words, two sheets of glass, one being red and the other orange—would be the safest window.

Herr LUCK said he had two such orange panes and one of ground glass, and was extremely well satisfied with the combination. He (Herr Luck) then exhibited a sunshade for the objective. It consisted of three parts—square pieces of pasteboard, the inner sides of which are covered with black velvet and the outer with leather. The middle piece is held in a horizontal position over the top of the lens by means of a brass rod which passes through a brass eyelet. The other pieces of cardboard are fixed one to the right and the other to the left of the centre piece. When the sun shines upon the right side of the objective the shade on that side is folded down, and when from the left the left blind hangs down; at other times these two are both folded back upon the centre one.

The contrivance was unanimously pronounced very ingenious and practical. The meeting was immediately afterwards adjourned.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

A MEETING of the above Society was held on the 1st March,—Dr. Vogel occupying the chair.

The CHAIRMAN stated that Dr. Hornig had sent 300 copies of his photographic year-book, for which he, as the President, had thanked him in the name of the Society. He (the Chairman) then introduced the subject of collodion cotton again, and said he wished to show by experiment that a blow or a knock was quite insufficient to induce spontaneous combustion, and that when saturated with alcohol it would run off quietly without exploding.

Herr PRÜMM said that, in consequence of recent orders, Herr Schering could no longer send collodion cotton as he used to do; but that he now dissolved it in a little ether and alcohol, thus preparing a gelatinous collodion containing twenty per cent. of cotton, and sent it in that state.

A committee, consisting of Dr. Weissenborn and Herren Schering, Bergmann, and Junghaus, was appointed to collect materials to support a petition against the existing prohibition of the transmission of collodion cotton.

The Chairman then read a letter from Herr Obernetter, in which the latter described his reversed negative process. Herr Zipser had experimented with the process, and the results were shown. The subject photographed in all the cases was a plaster bust with a background of dark drapery. The preparation of bromide of silver dry plates and of iodide of silver plates appeared very simple. Wet bromo-iodised plates, however, required rather more care in their preparation than ordinary wet plates, if streakiness was to be avoided. The sensitiveness of these plates was, however, not behind that of ordinary plates of the same composition. Herr Obernetter employs this process with success for his coloured plates, for which he must use, according to circumstances, iodide of silver, bromide of silver, or bromo-iodide of silver. With respect to photographs with coloured glass, he says that if a sheet of coloured glass be placed between the object and the negative it must be placed quite close to the sensitive plate and as parallel to it as possible. He, however, prefers to use coloured collodion.

Herr PRÜMM regretted that a plaster cast was the only object photographed. He thought it would have been interesting to have seen some negatives of coloured objects or of living persons, because, as was shown by the experiments with Warnerke's and other dry processes, white objects always gave the most successful results.

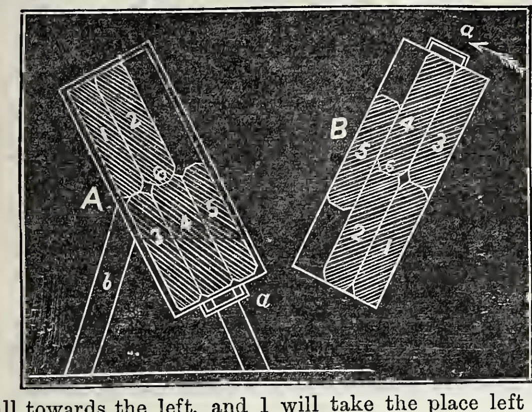
The CHAIRMAN thought that one might sufficiently study the sensitiveness for dark objects in the details of the background of drapery.

Herr QUIDDE asked how it came that this process gave useful results now when it was found useless when tried on former occasions.

The CHAIRMAN replied that it was probably because the washing after sensitising, which washing was indispensable, had been omitted.

Herr Linde spoke at some length on the causes of the present depression of trade, and lamented the length of time required to print a large edition of any picture, so that when an individual became suddenly celebrated, and there was a great demand for his portrait, if the weather were bad the demand might cease before the orders could be executed. According to Herr Linde the Woodbury process is not worked in Berlin, and to get a picture multiplied by that process one would require to send the negative to England.

Herr Bergmann showed an album which he considered particularly adapted for the reception room, as it was almost impossible to abstract the pictures from it. It is a very simple contrivance, consisting of a box thirty centimetres long, twenty wide, and seven in depth. The sides are of wood, the lid and the bottom of glass. The box can be moved horizontally, so that sometimes the lid and sometimes the bottom is uppermost. In each of these positions four *cartes* in one cardboard frame are shown. Every time the box is turned the two upper frames are turned undermost, and in their place two new frames make their appearance, and so on until all the *cartes*, fifty-two in number, have been seen. The accompanying diagram shows the principle of the contrivance. A and B show the layers of frames in section, 6 being the axis upon which the box rotates. Not to make the thing too complicated in the figure only five frames are shown, all made the same size and to fit into the box, leaving a space for one. The frames being arranged as in A, the space next 2 is empty. Turn the box until it comes into the position shown in B, when 5 will run down to the empty space alongside of 2. In this way there will be a new empty space alongside of 4, and if one still turns the box in the direction indicated by the arrow, 4 and



3 will fall towards the left, and 1 will take the place left vacant by 3, and lie on the top of 3. The same thing happens with any uneven number of frames, if they are properly arranged to begin with. *a* is the lock of the box.

Shortly after this album safe had been examined the meeting was adjourned.

Correspondence.

RESTORING AN INERT FERROUS OXALATE DEVELOPER.

To the Editors.

Gentlemen,—It may interest those of your readers who are using the ferrous oxalate developer to know that the activity of the solution which has become spent by use or exposure may be restored by means of metallic iron.

The best way of procedure will be to keep permanently a hank of fine bright iron wire in the solution, and, if necessary, to quicken the deoxidising action by heating the solution and iron wire together until the full effect is produced.—I am, yours, &c., Joseph W. Swan.

11 *and* 15, *Mosley-street, Newcastle-upon-Tyne,*
April 17, 1878.

PERMANENT PRINTS.

To the Editors.

Gentlemen,—I may not quite fully have explained (though I have wished to do so) my principle or idea as regards the permanence of photographs.

I have stated in my letter printed in your Journal of the 19th that I consider it to be an absolute necessity that nothing should be exposed to light which *can* change.

I believe that albumen, gelatine, &c., are liable to change colour or fade as regards the image they bear when exposed to light (I believe also the silver and gold may change); and, to put the matter perfectly plainly, I have thought, and do still believe, that by using a film of cotton charged with permanent colour, the same to be flowed on the print before the final backing of gelatine or glue is applied, is the only way to overcome the difficulty.

The cotton being insoluble in water, and the pigments, according to my plan, being insoluble also, resist the action of the water required for the necessary purposes of the processes of the chromotype patents. My patent cannot apply to any other than these chromotype patents, and is perfectly inapplicable to any other system of photographic printing to my knowledge. For silver prints it would be perfectly useless, and as they are, to my mind, absolutely numbered among the past, I put them altogether out of the question.

So far as my limited experience allows me to judge I should say that the only reliable photographic print to be obtained as regards permanency is that done by the double transfer process of the chromotype patents, humbly submitting that for perfect security my little innovation should be added, whether tinted or in pure white. My object is to secure anything liable to change from the action of light. With what I have written before I think this ought to be sufficient.

Some people say—"We don't want prints to last too long, because we get fresh orders." Is this honest?—I am, yours, &c.,

Harnham Cliff, Salisbury, April 20, 1878. Thos. Parkyns.

A CORRECTION.

To the Editors.

Gentlemen,—Please correct a mistake Dr. Nicol has made in his account of our premises at Lenzie. The large negative he alluded to was only *five* feet long, not "seven," as he has stated.—We are, yours, &c.,

Glenbank, Lenzie, April 22, 1878. T. and R. Annan.

THE LATE MR. LAMPRAY.

To the Editors.

Gentlemen,—Our attention has just been called to a paragraph in your issue of January 18th, 1878, in which you refer to the decease of Mr. Lampray, and state that "he was at one time a member of the *now non-existent* firm of Ordish, Lampray, and Co."

We beg to remind you that the firm is *still* in existence (as it was many years before Mr. Lampray joined it) under the style of T. Ordish and Co. Mr. Lampray was a member of our firm for the short space of about two years in 1861-2.

We should not have noticed this, but fear your statement may have given rise to erroneous impressions.—We are, yours, &c.,

108, *Hatton Garden, London, E.C.,* T. Ordish and Co.
April 20, 1878.

HORIZONTAL LINES.

To the Editors.

Gentlemen,—I may now take it as proved, I suppose, that vertical lines of considerable height, although truly parallel, appear in perspective to converge, according to a simple law of relative distance. But, in order to add confirmation to the views I advocated in my former letter, I may add that the argument is strictly borne out by trigonometrical reasoning. A well-known problem in that science will show any one who cares to work it out that, at 300 feet distance, a line 40 feet in length observed from a point directly opposite to the middle of it subtends (or is opposite to) an angle of 7° 37'; while at a distance of 340 feet the same line subtends an angle of 6° 44'—a diminution amounting to one-eighth, or in the ratio of 1 to 1·12. Here I may remark, in passing, also, that, strictly speaking, in my last letter 340 feet should have been stated to be an eighth, instead of a tenth, part longer than 300—literally, $\frac{1}{7\cdot5}$. This only strengthens my contention, and shows that the side of the tower is some five feet shorter in appearance at the top than at the bottom.

I now pass on to horizontal lines; and, in a general way, presume that no one doubts the evidence of his senses, and that all horizontal lines below the eye seem to run upwards into distance, and all lines above it downwards, to what is technically called the "vanishing point" in the horizontal line. It is the exact amount of this apparent elevation and depression that I propose in a few words to investigate.

Let us, then, suppose a terrace some 300 feet long, the houses in it being 50 feet in height. An observer takes his stand at a distance of 70 feet, directly facing a house 200 feet from one end of the terrace. I want to know how much smaller the last house at the other end of the terrace will appear to be. Calculating as in the case of the tower (*Euclid* I., 47), I find that house is 213 feet distant from the observer, or nearly three times farther off than the house he is standing opposite to, which is 70 feet from him. The apparent height, therefore, of the distant house is exactly one-third of the height of the others, or some 17 feet.

But this diminution is due both to the lines running upwards and downwards, on either side of the horizontal line, which is taken, as in the instance of the tower, at five feet from the ground. The amount of diminution, therefore, has to be divided in the proportion of 5 to 50, or of 1 to 10. In other words, the bottom of the distant house, instead of being five feet below the horizontal line, appears only 1·7 feet below it; and the top of the same house 15·3 feet above that line, instead of being 45 feet.

Let us next suppose the point of observation to be removed backwards to double the distance, or to 140 feet; what should we then find? It is now 240 feet distant from the farther end of the terrace. But the house directly opposite to it is now reduced to one-half of its former apparent height; and the distant house, also, is reduced in the same proportion to 25 feet, as 140 feet is to 240, or as 1 to 1·7, or 15 feet—only two feet less, be it remarked, than in the former case, while the highest house opposite has been reduced by 25 feet. Nothing could prove more strongly than this the value of retiring back from such an object towards ensuring a better balance of lines and less abrupt perspective than is generally to be found in architectural views. It also shows the value of long-focus lenses, where practicable, for such views. They compensate for the apparent loss of size, while preserving the favourable proportion among the lines of the picture secured by the longer distance of the standpoint from the object.

I might pursue the subject into another case, where the eye or a camera is directed obliquely towards the terrace in question; but, while complicating the matter somewhat, no additional light would be thrown on the amount of apparent convergence among horizontal and parallel lines. So, also, horizontal lines on the ground rapidly converge, as anyone may see by observing parallel lines of rails along a mile or two of perfectly straight railway. But I forbear from saying more at present, and hope I have made my meaning clear when demonstrating that all parallel lines of considerable length seem to converge when seen in perspective, and that the amount of that apparent convergence is measured by their distance from the eye of the observer.—I am, yours, &c., James Stothert.

Clapham, April 20, 1878.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Wanted to exchange, a one-gallon copper still and iron furnace complete, a mahogany camera ten inches square, and cameo embossing press for *cartes*, for good backgrounds or accessories.—Address, H. Buttrum, Wolverton-road, Stony Stratford.

A 10 × 8 Weston's patent burnisher, quite equal to new, with extra stand and cover, and spirit lamps, will be given in exchange for a No. 5 Ross's symmetrical or Dallmeyer's whole-plate wide-angle rectilinear.—Address, W. Dakin, Holly Bank, Nether Edge, Sheffield.

ANSWERS TO CORRESPONDENTS.

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

F. S. K.—In our next.

J. W. N.—The grey paper will be found most useful; next to that will be the green. Red is most objectionable. Under the circumstances, papering the interior of the studio will prove preferable to painting it.

Maxwell Jackson.—You will find among our articles and correspondence in the present number several useful hints on the subject of the new developer. The lectures of Mr. Bolas are to be published *in extenso* in due course. A fortnight hence the new camera will be described.

Mezzotints.—Moisten a tuft of cotton wool with glycerine, and with it rub the whole surface of the old oil painting. This will impart such a degree of brilliance to the picture as will enable you to obtain a good negative from it. When the operation has been completed remove the glycerine by means of a sponge moistened with water.

J. Davis.—The artist to whom you allude must be prejudiced or ignorant, otherwise he would not have committed himself to such a statement. A collodion transfer is quite as durable as any other silver print. The diameter of the condensers you require will be about five inches. These can easily be procured, new or second-hand.

L. D.—In the first place, your collodion appears to have been too thin, and in developing you have used the water too warm, which has caused minute blisters that were not observed whilst the picture was wet. It is also possible that you may have squeegeed a little air in. The transfer paper enclosed seems to have been prepared for single and not double transfer purposes.

S. P. Q. R.—We have repeatedly worked with the lenses made by No. 4, and invariably found them good. We are not in a position to indicate the precise difference between the lenses you describe; neither can we account for the non-adhesion of the pictures to the mounts. The better way is to ascertain from the firm who supplied the mounts in what manner they should be used, and what kind of paste to employ.

Pablo (Havana).—1. The front lens of the combination is under-corrected. There is no remedy other than having the contact surfaces reground to a deeper curve. You may, however, try the effect of separating the back lenses in the manner you suggest.—2. Any good water colours may be employed for photographs. To make them take to the surface of the albumenised paper apply the tongue to the picture.

J. H. O. D.—How can it be expected that we should give you any estimate of the value of residues from a small sample of which we have picked out several pieces of broken glass? Send the whole batch to a trustworthy refiner, and he will allow you all that it is worth. Should this advice not prove quite to your liking, then we advise you to erect a furnace and effect the reduction yourself Full instructions for doing this have been given in a former volume of this Journal.

Gelatino-Bromide.—In a note received from Mr. Foxlee, just before going to press, that gentleman, with reference to Mr· H. B. Berkeley's letter, informs us that he has not tried *opaque* gelatine with alcohol in emulsions, his experiments in this direction having been conducted with Nelson's photographic gelatine. This, he says, will carry twenty-five per cent. of alcohol—a proportion which he considers quite sufficient to preserve it from decomposition, and at the same time enabling it to flow easily.

R. Peers —From your description of the lens we infer that the balsam by which the front lens is cemented has given way. Remove the lens from its setting, place it in lukewarm water at first, afterwards removing it to hot water. This will soften the balsam and enable you to separate the flint from the crown elements of the lens. Now make the surfaces quite clean by washing them with a little benzole or ether (collodion will also answer quite well), wipe with a wash leather, and re-cement them by means of a large drop of fluid Canada balsam placed on the centre of one of them. Gentle pressure, followed by moderate heat, completes the operation.

H. M. (Amateur).—We can only give a general reply to your queries. The powder at the bottom of the bottle is undoubtedly bromide of silver; but its presence does not indicate the predominance of either the soluble bromides or the nitrate of silver, and it is in the perfect balancing of these, without either being in excess, that the "neutrality" spoken of consists. The presence of either of these in excess may be ascertained by withdrawing a little of the emulsion, adding a little water, and dividing into two portions—to one of these adding a solution of any soluble bromide, and to the other a solution of nitrate of silver. The special solution by which a precipitate is formed will indicate in what direction a remedy must be sought.

Polaris (Greenwich).—A heliostat is only required when the exposure is to be prolonged. For an exposure of three or four seconds such a piece of apparatus will not be needed. If you call when you next come to town we will show you a very simple and effective design for a small heliostat, the cost of which will not exceed three pounds. In connection with this subject see the description of Monckhoven's heliostat given in our last Almanac. For solar enlargements it is the most perfect of all instruments, as well as the most convenient with which to work. In Mr. Viles's article, in the same Almanac, on *The Solar Microscope*, you will also see much that will prove both useful and interesting in your present course of study. In reply to the query in the postcript: let the diameter of the finder be two inches.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.**

South London Photographic Society.—The next meeting of this Society will take place on Thursday next, May 2nd, in the Rooms of the Society of Arts, Adelphi, when Mr. W. Brooks will read a paper on *Reproduction and Enlargement of Negatives by the Collodio-Emulsion Process.*

Blistering of Double Albumenised Paper.—In a note we have just received, a Havana correspondent describes the method employed by him in using this paper without the formation of blisters. He keeps the prints about half-an-hour in a solution composed of hyposulphite of soda, six drachms; bicarbonate of soda, one drachm; common salt, two drachms; and water, twelve ounces.

Bigamy.—On Saturday last, the 20th inst., Richard David Turnbull, an artist, residing in Uphampark-road, Turnham-green, was placed in the dock at the Hammersmith Police Court on a charge of bigamy. Mr. Farman defended. Inspector Whiteing, who had charge of the case, said the first wife was not present, but he could prove the second and third marriages. The prisoner's father was here taken out of the court, apparently in a fainting condition. Eliza Cruikshank, the prisoner's sister, was called to prove the second marriage. She said she was present at his marriage with his second wife on the 19th of June, 1862. She did not know the name of the church, as the marriage took place on their way to Sheerness. They had been living together. Eliza Mary Dore, the third wife, who gave the prisoner in charge, said she was living with her father in Castle-road, Newport, Isle of Wight. She was married to the prisoner on the 6th of April, 1867, at the Registry-office, in Plymouth. His second wife, who was in Brighton, had shown her the certificate of her marriage. She had written to the prisoner to fetch her from her father's. The prisoner said he had twice saved her life. He could not live with her, as her temper was too bad. He would rather break stones. In cross-examination, the witness said she met the prisoner at Plymouth. He came as an operator to her brother, who was a photographer. He brought his second wife with him, and said she was his housekeeper. The Inspector stated that he had been informed that the prisoner had married six or seven wives. Mr. Bridge remanded the prisoner, and said he would take bail for his appearance.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For the Week ending April 24, 1878.

These Observations are Taken at 8.30 a.m.

April.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
18	29·78	W	46	47	64	44	Dull
19	29·69	SW	51	52	64	45	Cloudy
20	29·54	S	55	55	56	49	Raining
22	29 87	E	50	53	62	47	Dull
23	29·64	E	50	53	60	46	Cloudy
24	29·58	E	52	53	—	50	Raining

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 939. Vol. XXV.—MAY 3, 1878.

ALBUMEN IN EMULSIONS.

The peculiar advantages which accrue from the use of albumen in the dry-plate film have been so long acknowledged that it is surprising to find it so comparatively little employed at the present day. This may be partially explained by the fact that the processes in which a film of sensitive albumen plays a part, though producing most perfect results, entail an amount of trouble in the preparation of the plates which in these days of simple emulsions operates strongly in lowering them in public estimation. In addition to this an idea is prevalent that albumen is, of necessity, very deficient in sensitiveness; but, whatever may have been the truth in days gone by, there is now no longer any ground for such a belief. We have, during the last year or more, seen many admirable examples of collodio-albumen pictures produced by means of exposures which, if not attaining the highest point of modern rapidity, would a very few years ago have entitled the process to take rank with the most sensitive of dry plates.

The employment of albumen as an organifier to be applied to the film after the removal, or in the absence, of free silver does not appear to secure the full advantages of that substance, and, moreover, the method of washing and organifying the plate is rapidly giving place to washed emulsion; hence the possibility of securing the benefits of albumen in connection with emulsion without introducing an additional operation into the manipulations possesses at the present time some importance. The preparation of a washed emulsion would appear at first sight to afford great facilities for the use of albumen, and to a certain extent its peculiar advantages in connection with silver have been secured; but unfortunately difficulties of a physical character are encountered which considerably limit the range of its utility, or in many cases entirely neutralise the benefit gained. As we have experimented in this direction on many occasions during the last three years, we propose to give a brief account of what may be done.

We have spoken of difficulties of a physical character in the employment of albumen in collodion emulsion. We presume it is scarcely necessary to tell our readers that these arise mainly, if not wholly, from the fact that albumen is instantly precipitated or coagulated by contact with alcohol or ether. To a less extent its coagulation by silver nitrate militates against its employment except in very small quantity in gelatine emulsion, as, unless very great care be exercised, it coagulates and combines with a considerable proportion of the silver bromide, which must be removed by filtration. In the latter case, however, it is not a matter of much moment, as the qualities of gelatine emulsion are such as not to require the extraneous aid of albumen.

In collodion, however, in spite of the precipitating action of the solvents, it is possible, by the exercise of certain precautions, to introduce the albumen in a state of extremely fine division; that is to say, it is coagulated in such minute particles as to form a smooth, opalescent emulsion capable of producing a film as free from structure as one of silver bromide. If in this mode of using the albumen its full advantages as regards structural qualities of the film be not secured, we may, at least, expect to derive those benefits which accrue from the presence of albumenate of silver, namely, a vigorous and beautiful image and good keeping qualities of the plates.

The first mode of introducing albumenate of silver into the finishep image is due to Mr. M. Carey Lea, who attains his object by precipitating an emulsion containing excess of silver by means of an organifier composed partly of albumen. This method is apparently correct in theory, and is capable of giving very fine results; but in our experiments we have invariably found a small proportion of the dried emulsion refusing to redissolve in ether and alcohol. This may, perhaps, be to some extent due to the character of the pyroxyline employed, but it would seem to arise from the separate formation of particles of silver albumenate dissociated from the precipitated cotton and silver bromide. However this may be, it is certain that a portion of the albumenate is formed in combination with the soluble portions of the emulsion, as proved by the altered physical and other properties of the resulting films.

A modified plan, which has given very excellent results in our hands, consists in precipitating an emulsion containing a slight excess of soluble bromide in a plain solution of albumen—one part of the latter to eight or ten of water rendered very feebly acid with acetic acid. After allowing this to soak for a quarter of an hour it is thrown on to a cloth filter and the excess of organifier gently pressed out; a small quantity of water is then poured through the filter, the object being to remove the excess of albumen adhering to the fibrous precipitate without dissolving that contained in its pores. It is next treated with a forty-grain solution of silver nitrate containing ten or fifteen minims of acetic acid to each ounce for five minutes or longer, according to the character and quantity of the precipitate, which is finally washed thoroughly until no trace of silver remains. The treatment with silver must not be overdone or the emulsion will be rendered "foggy."

The dried emulsion produced in this manner is harder to the touch and less easily pulverised than one precipitated without the addition of albumen; it dissolves more slowly, and requires a longer time to reach its best working condition, but is completely soluble without residue. It gives a hard, structureless film which adheres closely to the glass, and developes quickly and vigorously to a good colour. About the sensitiveness we cannot say much, owing to lack of comparative trials; but we can state that it is certainly not impaired by the addition of the albumenate. A variation of this method, in which the emulsion was allowed to set before treatment with the albumen and silver, did not prove so satisfactory. The dried product became so hard that after several weeks' soaking a large proportion of it remained undissolved; hence we recommend precipitation.

Captain Abney's method of introducing the albumen directly into the collodion is, no doubt, preferable if we can only succeed in surmounting the difficulties which attend its practice. A small quantity of ordinary concentrated albumen as taken from the egg may be emulsified by vigorous shaking, but the greater portion is coagulated in the form of a stringy mass. Dried albumen dissolved in strong ammonia or other alkali forms a convenient way of introducing a larger quantity into the collodion; but the deleterious action of the alkali upon the collodion, as well as its reaction in the presence of silver nitrate, must be borne in mind and allowed for. Caustic potash dissolved in pure alcohol takes up a considerable quantity of dried albumen and forms a convenient way of using it. We have succeeded best in the following manner:—

Supposing the quantity of emulsion to be four ounces, we take one ounce of collodion, to which we add the desired quantity of alkaline albumen, and also the requisite quantity of bromide for the four ounces of emulsion. If cadmium alone, or the double bromide of cadmium and ammonium or zinc bromide, be employed no difficulty will be found in dissolving the desired quantity, but the ammonium salt is impracticable. To the remaining three ounces of collodion the full quantity of silver for four ounces of emulsion, previously dissolved in boiling alcohol, is next added; if the solvents be of ordinary strength the collodion will bear from twenty to twenty-five grains of silver nitrate without exhibiting signs of precipitation—at least until it becomes cool; but if such should occur it does not matter much. Sufficient nitric acid is also used to neutralise the alkali added to the other portion, and to leave a slight excess. The two portions of collodion are then gradually mixed and well shaken after each addition, the silver collodion being poured into the other in preference to the opposite course. Should any of the silver be precipitated as the collodion cools it will be readily taken up again by the emulsion.

Another method which obviates or renders optional the employment of an alkali consists in the substitution of bromine for the soluble bromide in the collodion. It is not a pleasant method to adopt, however, as those of our readers who have had any experience in handling bromine will readily understand. The solvent action of the bromine appears to be sufficient without the aid of alkali; but, whether from decomposition of the albumen or difficulty in accurately measuring the proper quantity, we have not found it to behave in a uniform manner. If the alkali be used in addition it will be converted into bromide and *bromate*, which may possibly introduce a further complication. For these reasons we merely mention the bromine method without recommending it.

In conclusion: we may say that we have obtained more or less favourable results with all these methods, but decidedly the best with the first mentioned. We believe that a more systematic course of experiment would prove the value of albumen when employed in this manner, and therefore recommend its trial to those of our experimental readers who may be inclined in favour of albumen.

TISSUE DRYING.

The season passing away gives carbon workers, comparatively speaking, a time of repose and immunity from many of the difficulties at present inherent in the process. We apprehend that this summer will see a large increase in the ranks of autotype workers, owing to the publicity given to it by the recent discussion on the patent, and the proof that so many professionals are commercially taking it up; but still larger would be the numbers enrolled if by any means the uncertainties attending the working were removed.

It would be perfectly correct to state that carbon printing is simple to a degree, and that a child could learn it in half-an-hour; nevertheless there are in connection with it certain difficulties of a most annoying and perplexing nature, which require practice to enable one to conquer them—some which almost defy a cure. But to state this is almost a truism: in silver printing, with the experience of a dozen or two years, and of hundreds of hard workers—professionals and amateurs—the same rule holds good. To this day how many are there who are not annoyed with blisters or with difficulties in getting a rich purple free from mealiness in a highly-glazed sample of albumenised paper?

In carbon work the drying of the tissue is the one subject of trial and anxiety. A batch of tissue one day may work to perfection, while another prepared only a day later out of the same sample of tissue, and with the same sensitising bath and a similar length of immersion, will not work at all. After an investigation of every supposed cause it is discovered that the mode of drying had been to blame, and the carbon novice received his first lesson that upon the drying of the tissue much depends. Next time, perhaps, he makes his room nice and hot, and leaves the tissue for a few hours, to find it on his return in a heap of clots on the floor; the heat has been sufficient to dissolve the pigment gelatine, and so it has run off its supporting paper.

On another occasion, determined not to melt it in this fashion, he keeps his room very cool, and finds his tissue still tacky at the end of twelve hours; and so the changes are rung, till he finds that there are only certain working limits of temperature which are also governed by the hygrometric state of the atmosphere. Now, in a large establishment, where suitable plant for autotype printing has been erected, it will not be a very difficult matter to select an appartment which, by reason of its roominess and ventilating capabilities, will answer. But—and here is one leading cause for the lukewarm way in which, upon the whole, permanent photography is viewed—in how many establishments where silver printing has reigned for years is there any convenience whatever for "putting up" tissue where it will dry and be free from dust, and yet not in anyone's way? There is not a doubt that this is a capital difficulty in this new branch of photography, and some ready means of surmounting it would give a considerable impetus to carbon printing of all kinds.

Bearing in mind this difficulty of want of space and suitable accommodation in so many instances, we are very much inclined to think that a species of drying cupboard will be found to solve the difficulty. Such a contrivance, we need not say, has been proposed in these pages; but sufficient means have not been suggested for carrying off the moisture quickly enough. What is required is a box sufficiently large to hold a good number of feet of tissue, but which yet would not be too bulky. Naturally, a box or cupboard containing a series of shelves to hold the tissue flat would occupy the least space, and if they were constructed so that each shelf covered the whole area of the box except for a short space on one side, they would, if the shelves were arranged with this space on alternate sides, allow a continuous current of air to pass over the surface of the tissue placed within. Air holes at top and bottom would complete the arrangement, with the exception of the means of creating a current, and this would require to be done artificially. A far simpler contrivance, but less efficient in some respects, would be a box to hold the pieces of tissue suspended side by side over rods, or some similar contrivance, requiring also artificial means for creating a current.

It is to this point we direct attention. The draught created by the burning of a gas flame in a narrow chimney connected with such a box has been proposed, but we think it would be found entirely inefficient; for, besides the consideration that once such means were used, the box would require closing, and all that might be termed natural ventilation and circulation of air stopped, it may be easily calculated that the change of air would be slight. A gas burner consuming six feet of gas per hour is a very large one, and (even allowing for a little additional suction of air caused by the draught) it may be easily calculated that it could not cause more than a cubic yard of air to pass through in an hour's time—a quantity entirely inadequate to carry off the moisture from a few feet of tissue.

It is, therefore, demonstrable that a more powerful mechanical means would be required to do the work effectually; and this, we believe, could be devised at a very moderate cost by means of a fan turned by a specially-constructed turbine, and as every studio is of necessity supplied with water there would be no difficulty in obtaining the requisite fall. Any amount of current could be thus obtained, and the simplest of means could be used, if necessary, to heat the current where gas was available, or, with a little more trouble, by paraffine oil.

We have consulted a clever mechanician on this question, and he informs us that such an arrangement would be by no means costly. He has further promised us, as soon as he is a little freer from his engagements in connection with the Paris Exhibition, to work the matter out and make a model fan for us. Meanwhile we offer the idea for what it is worth to the body of photographers, leaving it open to anyone who chooses to carry it out. We may observe that the exit of the current should be from the top to the bottom of the box to take advantage of the superior specific gravity of moisture-laden air. It will also be seen that, if necessary, the draught might be easily conveyed by lead or other pipes any distance from the source of power—the water supply—if the necessities of the premises called for such an arrangement.

DRY PROCESSES—ANCIENT AND MODERN.

IV.—A COMBINED EMULSION AND BATH PROCESS.

We have, in a previous chapter, spoken of certain advantages which accrue from the combining together of the essential features of two distinct processes, and have shown that we may in such a manner secure the best features of both. We have now to follow out this idea in quite another direction, namely, the effecting of a union between the bath process and the bromide emulsion process.

It is too well known to require much comment that a bromide of silver emulsion, in which there is an excess of the bromide of ammonium, cadmium, zinc, or whatever other soluble bromide has been employed, is not sensitive to light. In the earlier days of collodio-bromide the system of having soluble bromide in excess, and removing it by washing the plate, was fully recognised and practised. In the printed directions for using the emulsion issued by one firm attention is specially directed to the fact that in proportion to the amount of washing the plate receives after being coated so does its sensitiveness increase. A reaction afterwards took place, and an absolute balance of the nitrate of silver and soluble bromide, followed in turn by a reversal of the first order of things—the nitrate being latterly in excess—set in, all these culminating in "washed emulsion," in which all the soluble salts are removed by water.

But previous to this it was proposed by Mr. H. J. Newton, President of the Photographic Section of the American Institute, to combine the emulsion system with the bath system. He made an emulsion containing a certain excess of soluble bromide, and when a plate had received a coating of this it was sensitised by immersion in a comparatively weak bath of nitrate of silver.

When a plate is coated with iodised collodion a dense, creamy film of iodide of silver is obtained by immersing the plate for about two minutes in a bath containing a thirty-grain solution of nitrate of silver; but when a dense film of bromide of silver is desired a silver bath of more than double this degree of strength is necessary, added to which the plate must be immersed for about a quarter of an hour in order to effect the formation of the bromide of silver. It is of no use trying the preparation of a bromised plate with a strongly salted collodion and a silver bath of the ordinary strength; for the bromide of silver formed under such circumstances falls off in patches from the surface of the plate. To impart the great bulk of the bromide of silver to the film Mr. Newton, as we have said, emulsified the collodion to a certain extent, leaving the bath to complete the operation of sensitising the film. Now, while it is quite true that all traces of soluble bromide may be removed from a layer of collodion by washing it with water, it is further true that the necessary degree of washing to effect this properly must be tedious and protracted; for the bromide, although quite soluble in water, appears to cling with a marvellous tenacity to the pores of the collodion, from which it is only eventually dislodged with great difficulty. It yields rapidly, however, to the converting influences of a solution of nitrate of silver, which permeates the pores of the collodion and arrests the soluble bromide wherever it is found by its natural chemical antagonist. After removal from the nitrate bath the silver is, of course, in excess; but a slight rinse in distilled water leaves the film in an exceedingly sensitive condition. By the application at this stage of a suitable preservative a plate possessing exquisite sensitiveness, good keeping properties, and the most absolute freedom from spots or other imperfections may be obtained.

In our trials with the process described we have found either of the following two kinds of preservative yield very successful results. The first of these is one which was applied many years ago by Messrs. Blair and Adams to another process:—Procure two bottles, marked respectively A and B. Put into—

A.

Gum arabic	1 ounce.
Sugar candy	½ „
Water	4 ounces.

B.

Tannin	40 grains.
Water	4 ounces.

Mix A and B together in equal proportions, render the mixture *slightly* alkaline by the addition of ammonia, and let this be poured on and off the surface of the plate two or three times, or until the whole of the film shall have been thoroughly impregnated; after which wash the plate under a rose tap. When dry the plate is ready for exposure.

The other preservative is that which has been applied with so much success by Canon Beechey to the plates now so well known in connection with his name. It consists of a certain quantity of clear, *flat* (not sour) table beer in which has been dissolved pyrogallic acid in the proportion of a grain per ounce of the beer; *e. g.*, a half-pint of beer will require ten grains of the pyrogallic acid. It is best to employ a flat bath for containing this preservative, the plates being immersed for two or three minutes with slight agitation.

Although, from our description, this process may appear to be a little complex, in reality it is not so; and we can very strongly recommend it as a means of obtaining plates of the finest possible quality. The preservatives here mentioned do not belong to the process as it was originally published; but we adopted them simply because they answered better than any of several others that we have tried.

The development is effected by means of alkaline pyro., the exposure required being about the same as that given to a wet collodion plate.

A ready means of rapidly filtering the silver bath and other solutions is an indispensable adjunct to every well-appointed photographic laboratory, and many plans have been suggested as improvements upon the usual funnel and bibulous paper arrangement, the majority of which have taken the form of modifications in the shape of the funnel employed to support the filter, or of the method of folding the latter in order to bring a larger portion of its surface into action. With the ordinary glass or porcelain funnel the paper cone accommodates itself, under pressure of the liquid to be filtered, so perfectly to the shape of the support that only a very small portion of the apex of the filter is left free for the passage of the liquid. Any attempts to bring a larger surface into play tend, by depriving the filter of the necessary support, to weaken it and endanger the success of the operation without materially aiding the object in view. A very simple contrivance which came under our notice a few days ago permits the passage of the solution through every portion of the filter without in the slightest degree removing the support so necessary to prevent the bursting of the paper. It consists in substituting for the funnel ordinarily employed a conical bag of stiff hair-cloth, such as is used for making sieves. This must be so constructed as to be the exact shape of the cone formed by folding a sheet of paper in the ordinary manner, when it is obvious the filter will receive efficient support at every part of its surface. The edge of the supporting cone must be fixed to a rigid hoop of cane or other material, by which, with the assistance of a loop of twine, it may be suspended above the vessel into which the solution is to be filtered. The hair-cloth forms a perfect support for the paper without in any way retarding its filtering power. With aqueous solutions the operation proceeds with such rapidity as to convey the impression that the paper filter has been broken. The material does not appear to be affected by silver solutions or to act injuriously upon their working properties. The instrument shown to us had been in constant use with silver for some months without exhibiting the slightest deterioration. It was made by cutting the cloth to the required shape and cementing the edges with marine glue. It was stretched upon a ring of stout iron wire, also coated thickly with the same substance to protect it from the action of the solution, and though, perhaps, not presenting the most elegant appearance it will, no doubt, act as well as the best. While recommending this we have not forgotten the filter papers combined with netting or gauze for which Mr. Thomas Ross obtained a patent.

A FEW NOTES.

THE FERRO-GELATINE DEVELOPER.—EMULSION SPOTS.—THE GUM GALLIC PROCESS.

The editorial article last week on *Variations in the Iron Developer* is a particularly interesting one. Ever since the introduction of Mr. M.

Carey Lea's ferro-gelatine developer I have constantly used gelatine in some form or another, and can most cordially endorse all that has lately been written in its praise.

As simplicity is always desirable I have for years kept a standard solution by me for use as required. This is made by dissolving sixty grains of good gelatine in six ounces of water and two ounces of glacial acetic acid. A developer may be made up with this solution in place of, and in the same proportion as, the ordinary acetic acid. It keeps well, and may be mixed with a plain developer, as circumstances require. For landscape work it is most valuable.

But of all the purposes for which a ferro-gelatine developer may be employed the most valuable is as an intensifier, particularly when combined with citric acid. An intensifier made thus—

Protosulphate of iron	10 grains,
Gelatine solution	10 minims,
Citric acid	3 grains,

offers many advantages over pyro., especially for landscape work. The intensification may succeed the development proper without any washing, and with a plate just a little under-exposed a perfect negative may be secured; whereas if the plate were washed between the two operations some amount of detail would have been sacrificed.

I am sure I need not dilate on the boon it often is, when working in a tent, to be able to dispense with much washing. In fact, I have often managed to work without any water at all. The plate is intensified immediately after development, and when this operation is complete it is drained for a moment and flooded with a mixture of glycerine and water equal parts, and placed in the draining-box until a proper opportunity for fixing is found. This latter may be deferred for a year or more, if needed, without damage to the plate.

Those who once fairly try this citro-gelatino-ferro intensifier will not be likely to return to the use of pyro., except for very exceptional cases. I could mention several first-rate photographers to whom I have recommended it, and who have since continued its use.

The intensifier will keep in good condition for *years*. In the production of very large negatives, either direct or enlargements from transparencies, the gelatine developer and my pet intensifier have proved most satisfactory. The colour of deposit and quality of negative are everything that could be desired.

To those using these solutions for the first time a word of caution may be necessary. Do not over-intensify. The intensity increases a good deal on drying, and in a still more marked manner if heat be used, and also the colour of deposit is usually very non-actinic.

"*The Hybrid Process.*"—Owing to my communication on this subject last week having been printed as an article instead of a letter, with my address, as intended, the meaning and force of one remark may to some of my readers be a little obscure, and it is on a point of some importance. I remarked that "down here, at least, it appears impossible to get a negative" (with plain washed emulsion) "free from spots and other markings if the plate have been kept for even a few days." I cannot expect everyone to remember I am now living at Torquay, and unless that fact is taken into consideration the importance of my statement will not be readily understood. In this year's Almanac I have recorded my conviction that the spots in washed emulsion films which have proved such a bane to my comfort and peace of mind were caused by simple organic dust, and that moisture was needed for these particles to exert their deleterious effect. Now, with us in Torquay the air is constantly damp from many causes, not the least being the enormous quantity of salt particles it contains, and it is in such a climate that these spots seem to make their unwelcome appearance in extra numbers.

I am aware that my own personal experience in the matter is not the same as that of some other workers. I trust Mr. Woodbury will kindly excuse my mentioning him as a "case on the other side."

Some few winters ago this gentleman passed a few months in Torquay, and during that time made his first (or almost his first) practical acquaintance with washed emulsions. In spite of having to work without proper appliances and altogether in a most inconvenient way he produced several charming little negatives which were singularly free from the so-well-known spots; and I have been since informed by another enthusiastic emulsion worker that neither he nor Mr. Woodbury now ever get a spot.

These discrepancies between the experiences of various individuals are more puzzling than satisfactory. Of course there must be a cause, but up to the present we have failed to discover it. However, I hope I have said good-bye to spots also; but with me it is by going through the extra trouble of using a preservative for the plates.

As my experiments with albumen proceed they become more and more satisfactory, and already I feel such confidence in my plates as would warrant my depending solely upon them during a photographic expedition. I hope soon to be in a position to publish a thoroughly satisfactory formula, although one almost dreads to describe *another* new dry process.

One more note and I cease scribbling for this week. In the valuable epitome of dry processes, new and old, now being given in the Journal, I notice one small error in the description of the gum-gallic process. The process as given last week is as first described by its introducer, Mr. Gordon; but he afterwards much simplified the manipulation, and also, I believe, improved the process by mixing the gallic acid with the gum and sugar. A slight amount of discolouration occurs on the admixture, and at first Mr. Gordon did not think it correct to use it; but further experiments showed it to be harmless.

It is of importance that the mixture be used soon after making; in fact, none of the ingredients must be in solution for long before use. The gum rapidly turns sour, the sugar ferments, and the gallic acid decomposes. In making the solution of gallic acid Mr. Gordon deemed it of importance not to add more than the three grains to the ounce of water, as on proceeding in the ordinary way of pouring hot water on an excess of the acid and allowing to cool he sometimes found that more than three grains were held in solution, and, when mixed with the gum and applied to the plate, a portion of it crystallised out and produced annoying spots.

The best way to make the compound solution is to weigh out the gallic acid (say twelve grains), pour just sufficient very hot water on it to dissolve it, and then make up to four ounces with cold water. Eighty grains of powdered gum arabic and twenty grains of white sugar are now placed in a small muslin bag, and by means of a thread suspended at the surface of the gallic acid solution. The solution of the gum proceeds rapidly without any stirring and consequent formation of air-bubbles; and if the gallic acid have been previously filtered, and rather close muslin be used for the bag, no further filtration will be needed.

As this process is so thoroughly good a one, and likely to prove again useful, I feel I may be excused devoting these paragraphs to one of its important details. Henry Cooper.

THE REVERSED NEGATIVE PROCESS.

Latterly our negative process has made considerable progress through the emulsion process; the formulæ of Mr. Warnerke, especially, are precise enough to lead to good results if they be exactly followed. Still it is not easy, even by his remarkable formulæ, to prepare useful emulsions. Anyone who has made bromide of silver emulsions will know how an operator may worry himself with the work, often being in the dark for three days, and after all be unsuccessful—some slight want of foresight undoing the work of days.

In experimenting how to take separate colours the emulsion process has always rendered me good service. Photographs taken through coloured glass or liquids require very long exposures, and have the great fault of never giving congruous negatives; on the other hand, coloured collodion films give the same results and less incongrous plates. In my experiments, when taking negatives intended for colour printing plates, I required various prepared and *coloured* collodion films. The addition of the colouring matter to the collodion often destroyed my silver bath, and the addition of different sorts of collodion with different salts seems inconvenient; therefore I tried reversing the whole process and obtain the best results. The theory is simple. I prepare a silvered collodion, and use as a bath iodine and bromine salts. By having tried a variety of proportions I am now in a position to publish a very simple formula, which will render it possible for anyone to make further experiments in the same direction.

The preparation is very easy. The manipulations are the same as in our old process, exposure for a whole day involving no drawback. The sensitiveness may be greatly increased, the sensitive films may be coloured with every possible pigment without affecting the bath, and the negatives obtained are indistinguishable from those got by our own process. I produce with the same collodion three sorts of plates—bromide of silver plates, iodide of silver plates, and bromo-iodised silver plates. The latter give exactly the same results as by our ordinary process, and have precisely the same sensitiveness.

1. *Collodion.*—Place in a cooking-pot capable of holding half-a-litre five grammes of nitrate of silver, one drop of nitric acid, and two c.c. of water. Dissolve the silver by heat, and then pour over it 250 c.c. of ninety-six per cent. alcohol; then add six grammes of cotton and 150 c.c. of ether. When the whole is dissolved filter through

spun glass, fine flannel, or collodion filter-paper. The collodion is then ready, but naturally it is better to let it stand for a few days. I have some at present four months' old which is as good as when fresh, and will keep as long. This collodion is the foundation of all.

2. *Bromo-Iodised Plates.*—The glass plates are coated with silvered collodion, as in our old process; then, instead of being placed in the silver bath, they are placed in the following bath :—

Bromide of potassium	8 grammes,
Iodide of potassium	8 ,,

dissolved in 200 grammes of water.

The whole process is indistinguishable from that of silvering a plate, and lasts the same time. When the plate is ready wash both sides well with ordinary water. After washing I coat the plate twice with a solution of—

Nitrate of silver	8 parts,
Water	100 ,,

or an ordinary silver bath, when the exposure is to be short; when the exposure is to be long I add glycerine. After the exposure I develope, without washing, in the ordinary way with iron.

One may also develope with acid instead of with alkali. In developing with iron one gets precisely the same result as by our old process. [We use five parts of iodide of potassium, one part of bromide of potassium, to ninety parts of water and iron developer, and get good results, after washing and coating with silver solution, though not with quite the same certainty as in the ordinary process. One great advantage of the new process consists in the using of only one collodion and the avoidance of the silver bath and the faults that often accompany the silver bath.—Ed. of *Mitth.*]

3. *Iodide of Silver Plates.*—When working with pure iodide of silver I take one part of iodide of potassium and twelve parts of water. In other respects they are treated as the above. These plates give very hard negatives, so that they are especially suited for the reproduction of line engravings, pencil drawings, &c., and I have never copied copper plates more conveniently than in this way.

These plates are also easily used stained. If an aniline blue, soluble in water, be dissolved in the sensitising bath (eight grammes of nitrate of silver in one hundred grammes of water) and the plate stained blue, by this proceeding you will get a plate which is not sensitive to yellow, but sensitive to all other colours, consequently a printing plate for yellow. [Upon *bromide of silver* plates we get plates sensitive to *yellow*.—Ed. of *Mitth.*]

4. *Preparation of Bromide of Silver Plates.*—Bromide of silver plates may be developed by the wet process, but they give flat negatives; on the contrary, with an alkaline developer, or when treated as dry plates, they exhibit the same good properties which are rightly attributed to emulsion plates. The sensitiveness may be increased in a very remarkable way, as I shall hereafter indicate, and I hope by showing its simplicity to encourage many to experiment with it.

I shall assume that I am working with bromide of silver, so I use a bath containing one part of bromide of potassium to twelve parts of water. The collodion is poured on like iodide collodion. The bromide of potassium solution is used like a silver bath, and gives exactly the same appearance to a plate as a silver bath. When the plate is ready wash it well with water under the tap, and expose in the usual way; after the exposure one may either develope at once or wash first. Any *alkaline developer* will do. I use the following :—

No. 1.

Ammon. bicarbonate	20 to 50 parts.
Water	1,000 ,,

No bromide of potassium.

No. 2.

Pyrogallic acid	1 part.
Alcohol	10 parts.

To one hundred c.c. of No. 1 take four c.c. of No. 2. The picture developes in about half-a-minute, and becomes remarkably powerful, if the plate be well washed after the developer, and coated with the silver solution (one hundred water, two silver, three citric acid), the latter being poured off into a glass in which the proper quantity of water and pyrogallic acid has been previously placed. When the picture is powerful enough I fix with cyanide of potassium; but one may strengthen after that, if it be desirable. The process goes on smoothly and certainly, and besides it is simple. If before exposing the plate be coated with certain sensitisers its sensitiveness will be increased. By coating it with preservatives we get dry plates in the simplest way. After being bromised the collodion film may be stained with anything, as with dyestuffs soluble in alcohol or in water, &c., &c. I have never failed in the development. If the wet plate be coated with dilute glycerine it may be exposed without the delay of a single day, or it may be dried and used as a dry plate. [We have done so, and with the best results.—Ed. of *Mitth.*] If a half per cent. of tannin or morphia be added to the glycerine solution the plate becomes as sensitive again, but is apt to become fogged. The fogging may, however, be prevented by the addition of bromide of potassium to the developer.

The sensitiveness of the plate is surprisingly increased when the plate is coated with the following solution :—Nitrate of silver five grammes, water 100; neutralise with caustic ammonia until there is a very slight turbidity, and then filter.

In making these experiments I should advise great attention to be paid to the light used in the dark room, otherwise fog will be unavoidable. The film may be stained with any possible pigment without injury to the subsequent development. *When exposed, the plate should again be washed and developed with an alkaline developer;* then fixed with cyanide of potassium. The plates may be strengthened at will after being fixed.

These negatives have the peculiar characteristics of alkaline-developed bromide of silver plates of giving all the details, even in the deepest shadows, without the whites being quite covered. They have, in short, all the advantages of bromide emulsion plates, and are taken in exactly the same way, only that one is not plagued with the preparation of the emulsion.

I have no doubt that, by changing the proportions, many improvements may be made in this process, and I shall conclude by expressing a hope that any one who may carry his experiments in that direction farther will also publish his improvements.—*Mittheilungen.* J. B. Obernetter.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

The publication of the articles on *Dry Processes—Ancient and Modern*, in this Journal, recals forcibly to my mind the time—now many years ago—when the invention of dry processes formed the prevailing mania of the period. This is the way it was, or seemed to have been, managed :—An enterprising man, whose name I shall designate Mr. Alpha, discovering, from reading the Journal, that Mr. Beta has been receiving a certain degree of praise and credit for his pictures taken on plates preserved by means of (say) honey, determines that he, too, shall be an inventor, and *he* introduces something different from honey—it may be molasses. Mr. Gamma follows with golden syrup; another with raspberry vinegar; a fourth with glycerine; a fifth with wort; and so on, until malt infusion, beer, ale, double stout, chocolate, coffee, tea, and everything in the edible universe capable of yielding an extract or a decoction has been pressed into photographic employment. The imaginative faculties have been stimulated, and the capacity for research enlarged, by such a scientific proceeding as standing upon a chair and from that elevated point of sight subjecting the varied contents of the kitchen larder to a scrutiny far exceeding in fervid intensity that which even the cook herself displays during her most scrutinising moments. Delicious is it to experience those sensations that are the immediate precursors of the "agony of a find;" and such are the sensations still remaining in store for him who shall find something which has not been already forced into the service of photography as a preservative. So far as I know, Worcestershire sauce and mushroom ketchup are still waiting to be requisitioned by the photographic investigator and to be utilised as preservatives and organifiers. Everything else of a culinary or appetising nature, including mustard, has long ago succumbed.

It is gratifying to find that Mr. M. Carey Lea has been busily engaged in further improving the oxalate developer which he was good enough to publish last summer. It will still be some time before every necessary thing is known in connection with this valuable developer; in particular, a classification will have to be made of circumstances under which substances will act as restrainers. A soluble bromide, such as that of potassium, will restrain in the case of one process, but not in another. Acetic acid and oxalic acid have been found most beneficial additions in some instances, but not in others. Circumstances have occurred to prevent me from trying Mr. Lea's suggested addition of gallic acid since it was published on Friday last; but before this "note" meets the eye of the reader I hope, weather permitting, to have had a couple of hours with an oxalate developer held in check by both the collo-restrainer and gallic acid. One cannot thank Mr. Lea too much for what he has freely published concerning this new developing agent, which bids fair to be recognised as a most valuable addition to our development resources.

The announcement of the death of Mr. J. A. Spencer must have filled many with surprise. It seems such a very short time since his well-known face and form were seen moving about among his numerous friends and acquaintances that it is difficult to realise the fact that he is no more. The grey hairs of Mr. Spencer were beginning to impart to him just the semblance of that venerable appearance which reveals "the chinks that time has made;" but in no sense could the deceased gentleman be otherwise described than as a hale, hearty, middle-aged man. By all accounts the quantity of albumenised paper manufactured by the late Mr. Spencer during his lengthened career as an albumeniser must have been something enormous. Had he been a more selfish man than he was he would, in all probability, have never cared to bestow a thought upon the future of photography, or been solicitous as to whether silver or carbon were the better medium in which to hand down photographs to posterity, but, instead, he would have continued to cling to that established form of printing which had so large a claim upon his consideration. I regret to have heard that Mr. Spencer suffered intensely during the latter stages of his brief illness; a death from starvation in the midst of plenty is what cancer in the æsophagus results in, and from such a painful demise may every reader of these "Notes" be spared!

I, too, not in Arcadia, but in the land of *Spots* have dwelt; and Mr. Henry Cooper does not stand alone in this kind of experience. When are we to get at the bottom of this apparently unfathomable mystery of spots in emulsion plates? If one only knew the law which governed their appearance all would be well; but they seem to set all ordinary laws at defiance. For example: I possess an emulsion which is entirely free from spots if I use it after giving it a good shaking up, and yet that same emulsion behaves in the contrary manner if I filter it and allow it to repose for a day previous to applying it to the plate. Now, wherein consists this difference between these two conditions of emulsion? and why should repose cause spots? One would naturally enough conclude that such treatment would ensure immunity from them, but *they* scorn to yield obedience to any physical law. I don't mean to assert that the shaking up of every kind of emulsion just prior to use will ensure freedom from the evil, but it certainly proves a panacea in the case of some samples. Again: there are emulsions in which a spot is never seen under any circumstances; and, alas! there are also samples by which it is wellnigh impossible to obtain a plate that is quite spotless. Some persons assert that carelessness in the preparation is a leading factor in the cause of spots in emulsions; but these people merely record their own ignorance of the matter. Flippancy of assertion is seldom coincident with profundity of knowledge.

(To be continued.)

OUR APPARATUS.

No. V.

I MAY here remark that all bottles should be properly labelled. Nothing shows the slovenly and careless photographer more than a host of bottles, containing different chemicals and solutions, without labels, standing about. The fact of having to trust to the faculties of smell or taste to discover their contents is of itself sufficient indication of the necessity for labelling. Moreover, this mode of ascertaining the contents of a vessel set aside perhaps for months is very misleading, and the wisest of us may fall into error if we place implicit reliance on this method of diagnosis. There is one thing certain—that such a loose method of storage will lead to waste, if nothing worse. Bottles containing compound solutions or powders should have the formula distinctly written upon them, with any memoranda deemed useful when the compounds were made. The usual way of trusting to memory is very uncertain, and, if many experiments are carried on, leads to confusion, when a pencil jotting at the time would prevent anything of the kind, and you would have the satisfaction of knowing exactly what you are working with beyond any doubt. Vessels containing simple substances—aqueous solution of silver nitrate, for instance, or solution of carbonate of soda, &c.—should be labelled as such, with the strength of the solution indicated and the labels varnished; but, whatever method is selected, let it be done in a thoroughly distinct and unmistakable manner. The little time required for doing this will be amply repaid by the certainty and facility with which work can be got through.

Dishes are best made of glass, if of small size. Wooden ones having several coats of shellac varnish are most useful for large work, and answer the purpose well. Glazed porcelain dishes are useful, except for holding solutions of nitrate of silver, which will invariably penetrate and destroy the glaze after some little use. Basins for evaporating old silver baths or similar work should be of Berlin ware, as better calculated to withstand the heat without cracking. The plan frequently adopted of setting a Winchester quart glass bottle containing the silver solution in a pan of water on the fire is fraught with danger, as the unequal thickness of the glass makes it very liable to break and spill the contents. The process is much better and more expeditiously conducted by the use of a Berlin basin, placed on a tripod over a Bunsen burner. The solution can then be evaporated to dryness, or the nitrate fused without danger of fracture.

Dropping-bottles have now taken the place, on the score of convenience, of the minim measure in the measurement of very small quantities, the graduated tube and elastic ball arrangement being as good a form as any. When absolute accuracy is required—as in some of our emulsion or dry-plate experiments — the method of discharging drops from an ordinary bottle cannot be too much deprecated, as no two drops can be assured as being exactly the same quantity. If the photographer will take the trouble to dribble so many drops—say ten—into a minim measure he will see for himself the varying quantities that are poured out for the same number of drops from different bottles of various solutions; at anyrate, the experiment will give him some guide what to expect if he measure in this manner.

Jars for storage are best when made of glazed earthenware, with air-tight lids, or good bungs over which has been pasted smooth paper, to prevent the dust generally contained in the pores of the cork from contaminating the substances they are designed to protect. All corks used in storing dry substances should invariably be protected with leather, paper, or some material answering the same purpose.

Scales for weighing grains or small quantities are most useful if of the pillar form. The strings supporting the pans are in this make kept out of the substances being weighed, and are consequently more cleanly. With hand scales the strings are apt to become contaminated with the different chemicals weighed, and so introduce some chemical not desired into a compound, or scatter it about, causing waste. Glass pans are much superior to metal, and should always be carefully wiped after use and before putting them aside, care being taken that no chemical is left in the holes through which the strings pass. The whole apparatus should be kept nicely polished, and, when not in use, under a glass shade or box, to protect it from the action of air, moisture, and dust. Another and very necessary precaution in using delicate balances is to see that nothing of an adhesive nature is left on the box under the pans, and upon which they are steadied. A good hard rub with a clean, dry cloth should be given to this portion of the woodwork every time they are used.

With respect to mortars and pestles: for most photographic purposes a pint, or No. 4, Wedgwood mortar is most useful, as being a fair capacity and not too unwieldy for small quantities. It must not be used, however, for powdering very hard substances; for this purpose a bell-shaped, turned iron one will be found best, providing the substance to be powdered has no action on the metal or the metal on it. The pestle should be smooth and without flaws, or it may retain and convey impurities in its interstices from one thing to another that is submitted to its action.

Glass beakers of different sizes are amongst the most useful of our glass apparatus. Owing to the thinness of the glass they require handling with caution, and should never be set down on a hard, unyielding surface, such as stone or iron, without a small pad of some elastic material being placed to receive them. Woollen or felt pads are very suitable, and prevent breakage by too sudden changes of temperature, as when a vessel of hot solution is removed from the fire to cool.

Rolling-presses should be kept covered from dust, and carefully protected from damp or any fumes proceeding from chemical operations. If the steel once get rusty it is almost impossible to remove the damage without leaving an uneven surface, unless it be sent to the makers to be refaced. There are so many good forms of this machine in the market it would be invidious to mention any kind as being especially good; but the same precaution for keeping them in order applies to all. For small work I have used one with a stout glass bed with satisfaction for many years. The bearings are best made of steel, brass being too soft and soon wears unequally. If the pressure be controlled by one screw there is less chance of unequal rolling than when several have to be adjusted. In this, as in most other pieces of mechanism, the more simple the action the better. The polished steel or iron work may be kept free from rust when out of use by the application of a thin coating of suet and carbonate of soda, in the proportion of about ten grains of the alkali to an ounce of fat. This thoroughly rubbed over the metal previously made warm, leaving just sufficient to show a smear when rubbed with a clean finger, answers well.

A good pattern for boxes for strong mounted cards is a box about thirty inches long by fourteen or fifteen inches wide, and about an inch deeper than the width of the card, divided into cells across the narrow way. Each division can be labelled systematically from number so and so to number so and so, or lettered, if preferred. The edges of the box should be covered with strips of cloth to keep out dust. If the cards are stored in this edgeways, and not lying on each other, they will be easier to get at, and be better protected from scratches and abrasions that storage and frequent looking over is very apt to occasion. Boxes for negatives are convenient if made without grooves, and about an inch deeper than the height of the negative; in other respects they should be sufficiently large to hold them easily—say for a 6 × 8 negative seven inches deep, eight and a-quarter inches wide, and twelve inches long. A piece of smooth, stiff card must be placed between each. On the upper edge the number of the negative immediately before it can be written. This manner of storing is quite as effectual and protective, besides much more convenient to get at, than placing each in an envelope on a shelf, as many do, or in grooved boxes, which answer equally well but occupy much room without any compensating advantage.

E. DUNMORE.

TRANSATLANTIC NOTES.

HAVING landed at Philadelphia after a most delightful voyage, some of the incidents of which were recorded in my last batch of "Notes," and spent a few days in looking into things in general and photographic matters in particular, I proceed to make a few jottings that most likely may interest the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY. But it may be as well to say at the outset that my acquaintance with the photographic matters of Philadelphia must be but partial in its nature, the extent of the city being so great as to require much more time than was at my disposal to "do" it properly.

Some idea of the magnitude of the city may be formed from a statement of the fact that several of its streets are from twelve to fourteen miles in length, that it covers a larger area than New York, although from the way in which the houses are separated, especially towards the outskirts, the population is very much smaller. Great, however, as is the extent of the city, a visitor may easily get through a greater amount of work in it than in any other city or town, with which I am acquainted, of even less than a third of its size, in consequence of the admirable way in which the streets are arranged and numbered. They all run at right angles from north to south, and from east to west.

Philadelphia is the worst-lighted city I ever saw, the lamps being very few and far between. A practical proof of this lack of lights occurred to myself on the second night of my stay there. I had been invited to spend some time with Mr. Browne, ex-President of the Philadelphia Photographic Society, at 907, Clinton-street. This is a short but aristocratic street running parallel with Spruce-street, but only the length between Ninth and Tenth-streets. The houses are all exactly alike, the only difference being that at the hour at which I called the *jalousés* universally found outside every window in the city—and the country, too, for that matter—were some open and some, and much the greater number, closed. The street was, of course, so dark that to see the numbers was altogether out of the question, but it was not at all necessary. Being between Ninth and Tenth-streets I knew that the first number must be 901 on the south side, then 3, 5, and 7, so that the fourth house must be the required 907. I rang the bell with as much certainty as if I had read the name on the door-plate. While writing of finding Mr. Browne's house, I may say that I received from that gentleman and his family a right hearty welcome. He is an enthusiastic amateur, one of a large number in Philadelphia, and as they all seem to read and admire THE BRITISH JOURNAL OF PHOTOGRAPHY I was treated more like an old acquaintance than a mere stranger.

From a long and interesting conversation with Mr. Browne I learned that in the Quaker City—in which, by-the-bye, I did not meet with a single Quaker, so far at least as being indicated by any peculiarity in dress—collodio-bromide emulsion, so far as amateurs are concerned, has driven the bath and all previous dry processes out of the field. The emulsion most in favour is one containing a free bromide; and, if the specimens I saw are fair samples of what American amateurs are doing with it, there are those that I know in the Old World who must either "put their better foot foremost" or cease to boast that England is ahead of all other countries in the matter of landscape photography.

The solar camera has never been kindly taken to in England or Scotland, probably because the sun is so often hidden behind a cloud; but some work shown me by Mr. Browne made me wish that it might yet become a favourite. It was a print from a 10 × 8 negative which had been made in the solar camera from a quarter-plate taken in a pocket camera, and it contained all the juicy vigour and brilliancy of a direct picture. The solar camera employed was partly home made, and looked more like a toy or a model. The condenser was only about four inches in diameter. The motion of the sun was easily followed by means of two screws, while the whole apparatus could be lifted by one hand as easily as a fiddle case.

Everybody knows how important it is to have locks on boxes in which dry plates are kept, but it is sometimes difficult to get them applied to boxes already in use. I saw on one of the boxes in Mr. Browne's collection a most ingenious and useful lock for this purpose. It consisted of two plates of iron—I think nickel plated—each about three-quarters of an inch by an inch and a-half. These could be applied—one to the lid, the other to the body—without any necessity for opening the box. On the lower plate there was a slot and a slightly-projecting stud, and when the latter was pressed a little to the side the box was clasped, so that it could not be opened until the stud was pressed back to its original position. Below the stud there was a tiny keyhole into which fitted an equally tiny key, and when this was turned the stud became fixed, and could not be moved till the key was again turned. I have never in Scotland seen anything so convenient for the purpose, and hope when I reach New York to see whether they cannot be introduced to some of our apparatus manufacturers, as I am sure dry-plate workers would appreciate them.

It fortunately happened that during my stay in Philadelphia a meeting of the Photographic Society was held, and this afforded me an opportunity of meeting a number of amateurs that I should not otherwise have seen. The Philadelphia Photographic Society is in a very healthy state, composed principally of amateurs, and presided over at present by Mr. Ellerslie Wallace—a gentleman who is known to many of the amateurs of both Scotland and England. The members present received me most kindly and hospitably, and I spent a very pleasant evening with them. America is a big country, and a country of big things, the bigness extending even to photographic picnics or outdoor meetings. The principal business of the evening was the discussion of the report of a committee on a proposal for an outdoor meeting—not a run out and in, with hardly time to unpack the camera, as is too often the case with us at home, but a trip extending over several days, and the enjoyment of a taste of camp life. The subject was evidently one of considerable interest, and nearly every member present spoke, and spoke well, the result being that an excursion of one hundred and twenty-five miles, to extend over a period of six days, was almost unanimously resolved upon, and to settle the question the signatures of all who could and would go were attached to a copy of the resolution. How they manage to arrange matters I don't know; most things seem much dearer here than at home—even the street shoeblack expects ten cents (fivepence) for cleaning a pair of boots—and yet the report of the picnic committee estimated the total expense for the whole six days and nights, including everything, at from twelve to thirteen dollars (£2 10s. to £2 14s. 2d.), or nine shillings per day. The conveyance was to be by canal boat, so that they could stop when and where they pleased; and judging from the genial, jolly spirit shown by those present at the meeting they were likely to have a pleasant time during their anticipated trip.

Photography in Philadelphia, judging from the show-cases, is on the whole somewhat ahead of that in England and Scotland, looked at from the same point of view. Retouching is practised, but not to such a large extent, and the negatives would seem to be fuller of delicate gradation and detail. Cabinets appear to be more in demand than *cartes de visite*, and a highly-glazed surface the rule, a simple albumenised surface being the exception. An embossed oval is the favourite style, and in a large, very large, majority of cases it is surrounded by a highly-ornamented, but far from ornamental, margin—a margin, in fact, in very bad taste, and which tends to attract the attention from the picture itself. Philadelphia contains about five hundred professional photographers; but here, as elsewhere, the wheat, especially "the finest of the wheat," bears a small proportion to the chaff—so small, indeed, that I was told by one of those whose work is of a very high class (Mr. Fennimore, whose name will be familiar to some of the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY in connection with photographic literature) that there are probably not more than four or five first-class establishments in the city. This is, perhaps, somewhat under the mark, but I have no doubt that of the whole five hundred the really high-class men might be numbered on the ten fingers.

Mr. Gutekunst—whose wonderfully beautiful pictures and astonishing panorama of the Centennial Exhibition grounds have been exhibited recently in England and Scotland, seems by one consent to be regarded as *facile princeps* in the art—is worthy of more than a passing notice. Photography has evidently been a good friend to him, and he returns her kindness by executing his work as nearly perfect as it has ever been my privilege to see; and, by sparing no expense, he has made his establishment, for comfort, elegance, convenience, and facility for manipulation, as perfect as his work. Situated in a central part of one of the principal streets, it occupies an entire block or building of about six stories. The ground floor, with two immense plate-glass windows, is a saloon with an oval counter in the centre, at which are employed a number of very pretty and extremely polite young ladies, and *very* pretty young ladies are somewhat scarce in America. The walls are hung with a magnificent collection of photographs of all sizes and subjects, both plain and coloured; and from the bustle there, and also in the office at the rear, it is evident that a very large business is being carried on.

Attracted by the sound of a piano the visitor ascends the stairs leading to an elegantly-furnished and handsomely-decorated waiting-room, where there is quite a crowd of candidates, big and little, waiting their turn to be placed in the posing chairs; but kept from being wearied and in good humour by the music, which is continued during the whole day.

The studio, or studios (for there are two glass houses, or as they are called here "sky-lights"), are entered from the waiting-room, and if the visitor expects from their construction to learn the secret of Mr. Gutekunst's success he will be wofully disappointed. They are constructed precisely in the style almost universal in Glasgow, as described by me in a former series of "Notes"—a broad front light beginning at a height of about nine feet, and coming down to about four, at a small angle, and a side light of about six or eight feet wide, but pretty much blinded up. The sitter is placed on a circular platform some three feet in diameter, and five inches high. This platform is mounted on castors so as to run easily, and it does this so *very* easily that a little practice on roller skates might be a useful preparation to sitting for one's portrait on it. The backgrounds are also on castors, and Mr. Gutekunst seems to trust more to the position of the sitter relative to the lights than to any arrangement of blind, screens, or reflectors. In point of fact, although I saw at least half-a-dozen negatives taken, in which almost as many different effects were produced, the only changes made were the shifting hither and thither of the platform and background, the latter being simply a circular disc sliding on an upright rod on a heavy metal base, and painted in neutral tint from dark to light.

The exposures were, especially in the brilliant light of a clear American atmosphere, long—say from twenty to thirty seconds; but I am satisfied the negatives were all the better for it. In connection with the exposure I saw in use a pretty and, to my mind, novel device intended to overcome the tendency of the eye to become wearied and the expression to get dulled. It consisted of an upright box about fifteen inches high and eight inches square. On one of the sides there was an opening, the size of a *carte de visite*, near the top; on another a similar opening near the middle; on a third another below the last; and on the fourth one near the bottom. The box contained an octagonal cylinder on which were fixed a series of photographs, and as it revolved by clockwork each opening showed eight pictures passing in succession. The upper opening or frame (as it was ornamented so as to look like one) showed a series of eminent men, the second a number of beautiful women, the third some lovely children, and the fourth was rich in the comic element, including clown and pantaloon. The case also contained a musical box which could be made to discourse sweet music, and I feel sure that not a little of Mr. Guteknnst's success in catching the expression of his sitters is due to this pretty device and its effect on the minds of his sitters.

Mr. Gutekunst holds a Lambertype license for Philadelphia, but seems to confine carbon to large work; he showed me, however, some very fine specimens of it. The general impression seemed to be that there would be difficulty in working any kind of gelatine process during the very high temperature they have in the summer months.

The printing seems to receive more attention here than in the old country; and the printers are, on the whole, a more highly-educated class—I mean from a technical and artistic point of view—than those at home, and more attention seems to be given to washing, the use of tissue paper, &c., than with us. Here, as elsewhere, negatives accumulate rapidly, and notwithstanding that generally those four or five years' old are cleaned off, the stock at present on hand is considerably over one hundred thousand. Enlarging by the solar camera is more easily practised than with us, the sunlight being more generally available, and Mr. Gutekunst has two of these instruments pretty constantly in use. Some idea of the quantity of work done in this large establishment may be formed from the fact that while I was there an order was given for two new cutters for cabinet and *cartes de visite*, the economy from the use of which would be a saving of fifteen sheets of paper per day.

But I am afraid I have exceeded the space at my disposal for this batch of "Notes," and therefore must reserve the rest for my next communication. JOHN NICOL, Ph.D.

PHOTOGRAPHY AND THE FINE ARTS.

THE question is often agitated by originators of art enterprise whether photography belongs to the fine arts. Thirty years ago the daguerreotype infringed upon the liberal patronage extended to the painters of miniature likenesses, as large portraits were then only indulged in by a few wealthy families. During the past twenty years photography has made wonderful progress, both in popular esteem and in artistic quality, until the portrait painters acknowledge it as a formidable rival. They would fain decry its merits, but their criticisms are constantly disarmed by use in the preparation of portraits. Formerly the artist would secure fifteen or eighteen sittings from a patron, but now the usual custom is to obtain a preliminary photograph, to outline the figure on the canvas on an enlarged scale, which is constantly corrected by callipers, and after the first sitting for general likeness and colour to paint the drapery from the lay figure, guided by the appearance in the photograph, so that the man of business or the lady of fashion feels that only time can be given for three full sittings. The painters and sculptors will not accept the photographer as an artist, as they claim that his work is the result of mechanical and chemical processes, and does not depend on the necessary quality of design in all artistic work. Still the best photographers study as critically their composition of groups, arrangements of drapery, and position of the individual, as can any one using the brush, and the very difficulty of arranging the focus for all portions of the body, and the distortion in shape and size according to the respective distance from the optical centre, cause the operators to take great caution. With the advance of the profession, no operator can retain his position in a first-class gallery for a single week whose attainments are not greater than a complete knowledge of chemical and mechanical operations.

The want of recognition of photography is a fashion, the relative rank being that accorded in the infancy of the profession, and this is perpetuated by its management as a business. The operators and even the art assistants in crayon and water colours are unknown to the public, the work being credited to Black, or Sarony, or Gutekunst, without any notice of the individual professional talent employed—a system not conducive to the production of individuality of work, only so far as the proprietor of a gallery may have artistic skill, and is thus able to use his several *employés* as instruments to accomplish special ends. Yet no skill can elevate the work of artisans to lofty standards until they become artists, with quickened brains and fresh, original ideas.

The press has been forced to draw a broad line between artists and photographers, not alone because of the sensitiveness of the former class, but also from the unwillingness of the latter to submit to the fresh, healthy criticism which the painters must always meet. Like the artists of the whole West they exclaim that the time has not yet come for a full and free statement of merits and demerits; hence notices can only be given in a general manner, and it is only occasionally that a man can be found who courts the most candid examination and close discrimination of his work. A few months ago the experiment was tried of visiting the principal galleries of Chicago, and while the proprietors would gladly have paid money to obtain flattering notices, yet they instinctively shrank back from the trenchant pen freely employed to review the productions of the artists, and were offended at the plain words of disinterested criticism.

There is very much in the profession of the photographer to command high respect, and it is confessedly so much the popular portraiture of the day that it is knocking loudly for admission into artistic circles. The display of the American photographers at the Exposition Building in this city for a few days of July, 1874, was one of great interest, though no discrimination was made and thousands of inferior pictures were displayed; yet two months later the photographers were reluctantly admitted to a small space in the art hall, and the next year they were excluded altogether. The principle of hanging in the fall of 1874 was the only admissible one in connection with an art hall, for the manager arranged them on the walls according to intrinsic worth and to secure the most desirable general effect; but there was no previous selection, and all were allowed to furnish the same number of pictures. It might seem to many a backward step, and the art committee of another year might feel that it was an ungracious task, since the novelty of the step would provoke much adverse criticism, and few photographers have sufficiently advanced ideas to accord with the scheme; but it might not be a bad movement to make similar advances to photographers as to artists, selecting the best photographers, not alone of the United States, but also of India, Austria, Germany, France, and England, to solicit choice examples of their best work in all departments, and affording also to local operators the opportunity of presenting works of real merit.

All the common groups of pictures in one large frame should be positively excluded, both as unartistic in arrangement and positively uninteresting; for if a small picture has merit it deserves to be studied independently, and no multiplication of similar forms can add worth where it does not really exist. Merit should be the only question governing admission, though the space accorded by the art committee would necessarily limit the number of any special class of pictures to be accepted. Variety would be necessary to secure public attention to the collection, and as the fields of art based on photography, such as the prints finished in crayon, or in water colours, or in oils, crayons drawn after photographs, and similar pictures might properly be included, there would be no reason why this portion of the art display, by judicious pruning and efficient management, might not be made as profitable in developing a love for fine art as any of the departments with more lofty aims.

—*Phil. Phot.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 6..........	West Riding of Yorkshire......	Oddfellows' Hall, Thornton-road.
,, 8..........	Glasgow	172, Buchanan-street.
,, 8..........	Cheltenham Amateur	Savings' Bank.
,, 9..........	Manchester....................	Memorial Hall, Albert-square.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual monthly meeting of this Association was held on Thursday evening, the 25th ult., at the Free Public Library, William Brown-street,—Mr. H. A. Wharmby, President, in the chair.

The minutes of the previous meeting were read and passed.

A letter from the Hon. Sec., Mr. W. Murray, was read, announcing that the presentation print for 1877, the *Arch of Constantine*, from a negative by Mr. O. R. Green, was now in the hands of the Autotype Company.

Mr. Moore sent some fine American cabinet and *carte* pictures for exhibition.

The Rev. H. J. Palmer passed round gelatine negatives by his favourite process on glass and on films, also two groups on Bennett's instantaneous plates, with which he was much pleased.

Mr. Weber had some fine lantern slides from negatives by the gelatine process.

The President exhibited a number of $7\frac{1}{4} \times 4\frac{1}{2}$ negatives on washed emulsion plates.

It was proposed by Mr. J. H. T. Ellerbeck, and seconded by Mr. W. H. Wilson, that the question of this year's presentation print should stand over until after the midsummer recess, and that members be invited to prepare negatives for competition for this purpose.

It was also decided to have an excursion to Speke Hall, on May 11th or 18th, if the requisite permission could be obtained.

The meeting afterwards adjourned until the 30th inst.

THE PHOTOGRAPHIC SECTION OF THE AMERICAN INSTITUTE.

At the February meeting of this Society Mr. H. J. Newton, the President, occupied the chair. After some preliminary business had been disposed of,

Dr. Higgins said: Mr. Newton, at our last meeting, exhibited a certain negative, in taking which he placed in opposition with the print copied a piece of glass, one half of which was tinted slightly with blue (aniline, I believe). The negative showed no distinction; the two halves seemed exactly alike. Mr. Chapman thought, at the time, that the intensity of the blue was not sufficient to make it an *experimentum crucis*. Since that meeting I have tried the same experiment in a somewhat different manner, and in a manner that, I think, will be considered pretty conclusive, from the intensity of the blue glass I used—an intensity far greater than probably ever would be made use of—the ordinary blue glass which has been the mania for a long time, pure cobalt, and of very great intensity—that is, as far as photographic use would go. In that shield (exhibiting) I placed two pieces of glass, of the same thickness by careful microscopic measurement—one white and the other blue. I then placed in the shield a sensitised plate, and exposed to the gaslight. The result is here shown. The upper half has one-half the exposure of the lower. The right hand is the clear glass; the left the other. They are marked. It will be seen that with that intensity of blue the injury, or, rather, decrease in sensitiveness, is about one-half, especially if the two corners, which are marked with a jog, taken out are compared, as the exposure of one is exactly double that of the other. The right hand is the white glass, the same as in the shield, half exposure—ten seconds on that, twenty seconds on this (the blue). When exposed an obscuring medium was placed over the glass in that way (illustrating). I pursued the experiment in the same way with a negative in copying by gaslight, thinking that, possibly, and very probably, the yellowness of the gaslight flame mixed with the blue glass in the shield would, as it naturally would do, give a green character to the light passing through. I then exposed a plate in the camera by daylight, and the result is here shown (exhibiting). The square in the centre of that plate is simply a piece of card, to see that my emulsion was working clearly. That was directed to simply a white sheet hung up in the room; it does not show quite so much difference by daylight as by gaslight. That plate also shows the loss of power which results when a portrait lens, as that was, is used upon a plate that was focussed upon a white sheet. A curious result occurred in the taking of a further picture. I separated the two pieces of glass in this shield, leaving a half-inch or thereabouts between them, so that there should be no glass interposed between the object taken with the camera in the daytime and the negative. The result is very marked, showing the loss of intensity when the light passes through a glass. It is often said that portraiture, or work inside the room, is much slower than outside work; may it not be that the light has to come through the glass with which the room is roofed, and that if those roofs were sliding we should have the same quickness as we would have outside? I think, also, that that last plate shows how much the thickness of the glass in lenses has to do with their responding quickly to the action of light. I think that would satisfy Mr. Chapman.

The President: He would argue that there would be a difference; that the ratios would diminish with the depth of colour. My experiments were made mainly to see if Mr. Chisholm's conclusions were correct, as he was strongly impressed with the idea that he got quicker results with blue glass, but it was a very delicate light blue that he procured in this city; so that in making my glass I only aimed to get just sufficient blue to change definitely the colours under the blue, making the yellows green, the reds purple, and the browns a deeper or colder brown. That was all that I aimed at. I felt very confident that blue of that depth would be a very serious impediment in the force of actinism in the solar ray. I think that Dr. Higgins' experiment is conclusive as to the retarding influence of the blue of that degree of intensity.

Dr. Higgins: And, to follow it up, there can be no such thing as acceleration by blueing the light.

The President: That is the ground that I have always taken. I stated that, unless it could be shown that there existed in the solar ray a retarding influence which was filtered out by the use of a blue medium, there was no foundation in theory even that acceleration was possible in the use of blue light, for all the actinism in the solar ray is contained in white light.

Dr. Higgins: In taking these negatives I had to make a special emulsion, to work exceedingly slow. In using my ordinary emulsion (I do not know whether it is slow or rapid; usually an exposure of two seconds is a full exposure with it) I found it very difficult to not over-expose it, and then the difference was not so marked by any means. Therefore, I made a very slow emulsion, with which I could expose ten up to twenty seconds without over-exposing; then the difference between the two was easily discerned, but with a sensitive emulsion it was not so conspicuous.

The Secretary (Mr. O. G. Mason): For several reasons I do not consider the experiment so critical a test as the one the President made. One reason is, here are two pieces of glass not identical—one blue, the other clear; it may have a greenish tint or a yellowish tint, if examined critically. If you could take the blue out of this blue glass we do not know what we would have left. There may be a green or yellow tint mixed with the blue, but the blue preponderating to such an extent that it obscures the other colour. In experiments requiring such delicacy in order to arrive at a certain and satisfactory conclusion I think it is necessary that all those points should be carefully considered. Ten or twelve years ago I put in my studio a window glass similar to this; and then I changed it for a much lighter blue, and found the difference very marked. These experiments led me to the conclusion that properly-constructed blue glass, having the proper amount of blue on or in a proper body of otherwise colourless glass, was really an advantage. I actually believe that it does not retard the actinic force at all; and I yet believe that if Dr. Higgins will go into such a series of experiments as he is capable of carrying out, he will find the blue glass has some virtue in it.

The President: The glass that I used was a sheet of 8 × 10 inches, very thin—I do not believe it was a thirty-second part of an inch in thickness—and that would account, probably, for there being no perceptible difference between the part covered with the glass and the part that was not. In my experiments I am inclined to think that where the glass is immediately in contact, pressed upon the object being copied, that the difference would not be as perceptible as if placed in this position.

Dr. Higgins: There is no doubt that the thickness of the glass would have to do with the result. In my case it is quite a heavy glass—a thick piece of ordinary negative. In the President's case he used very thin glass, and the result would not be as perceptible. Again: the light going through the lens, all the rays of light that struck the picture perpendicularly to itself would not suffer refraction, only those striking it obliquely. Light, in striking perpendicularly upon a medium, passes through without refraction; but if it strikes it in the least obliquely then it will become refracted. In my case the absence of glass here in the central part of the plate is seen, so that the presence or absence of it would have no effect, so far as refraction of the rays would go. In the President's case it would have great effect, by reason of its object being inclined at an angle.

The Secretary: I had in my possession, and still have, a series of French lenses which, if you remove from the cells and look through the edge, you will find the glass has quite a blue tinge, instead of yellow or green. These lenses worked a very great deal quicker than any others I ever used. They are also somewhat thinner than our American lenses, and that may have had something to do with their action. I found that the lenses made by that firm invariably had this tinge of blue. Another fact was brought out by the complaint of a brother photographer that his lenses which he had been using some eight or nine years, he was confident, worked a great deal slower than at first. The question naturally arose, why they should work slower? He had been through experiments which convinced him it was not retardation resulting from the use of chemicals less sensitive to light, but it was really the lens. It had been used for outdoor work, and he had allowed the light to strike on it (probably been in the full blaze of sunlight for a great many hours), and it is possible that the tinge of the glass may have changed somewhat.

The President: The colouring of glass by long exposure to light depends something upon the flux used in its manufacture. One of the proprietors (Mr. Gaffield) of the Lennox Glass Works, in Mass., was at one of our meetings several years ago with a large quantity of samples, specimens of glass that were very old, some being obtained from windows in buildings at Bowling Green, that had been in the windows fifty, sixty, seventy or more years, and had turned a very deep, dark brown. He stated that this result was found mainly in glass where magnesium salts were used as flux.

The Secretary: I might differ a little with both the President and Dr. Higgins in that which perhaps appears to them an axiom—that a part is not, for many purposes, equal to a whole. Now we will suppose a case. We have a ray of what we call white light, which we know is composed of primary colours, or that it can be decomposed, showing that it contains blue, yellow, and red, which have very slow actinic force, possibly retarding also the other rays. Suppose that we can take from that white light the red and yellow, is it not fair to suppose we gain instead of lose? Another case: we all know that certain acids will act as corrosive agents upon certain metals; that these acids are made of exactly the same elements in different proportions. Now, if the whole will accomplish a certain thing, why do we vary those elements and leave a part of one element out and put in a greater proportion of another? If these proportions are not fixed pretty nicely the action is very materially modified; and I believe there are parts or portions in a ray of what we term "white light" which have a retarding instead of an accelerating influence in photographic work. A series of experiments, concluded many years ago, plainly indicated to me that such was the fact.

The President: This matter was pretty thoroughly investigated by a committee of this Section several years since. It was brought to the immediate notice of the Section through the introduction of a paper by a scientific gentleman, Mr. Gutzlaf, residing in Bahia, S. A., and brought here by Mr. Gaensli. This gentleman had gone through a very elaborate series of experiments with different-coloured pigments—red, orange, and yellow—to ascertain the correctness of the theory of Edmond Becquerel, which up to that time had been received by scientific men in the main as correct. That part of it with which we have to do proceeds in this way: that the orange, red, and yellow have no actinic property or force, but contain properties peculiar to themselves, which are manifested in this wise—they have no power to educe a photographic image on a sensitive film, but when that image has been once impinged by the more actinic rays they have the power of carrying on the action which has been set up. Now this gentleman had prepared a very peculiarly-coloured glass (I have it at my house now; Prof. Tilman, Mr. Chapman, and myself were on the committee). He gave the details of the manner in which it was prepared, and claimed that it was perfectly non-actinic. He had utilised it in this way:—He would take a negative with half the ordinary exposure in the gallery, place it under this coloured glass, and expose it to direct sunlight under this coloured glass for a definite period of time, which could be determined with a little experience, and the action would continue, so that if one made a picture in half the time and allowed it to be acted on by this light and then developed it he would get a fully-exposed negative as the result. This was his claim; and, when it was brought here, there were negatives brought with it to illustrate the fact. Upon investigation we found that the whole theory was a fallacy—that the light acting through that very non-actinic glass was actinic; and to demonstrate this fact I prepared a sensitive plate and covered one-half of it and exposed it under that glass to the direct rays of sunlight for five minutes, and then developed it. The part that had been exposed developed very quickly. His experiments had evidently been superficial. We took that same glass to Mr. Rutherfurd's observatory, and under a powerful condenser submitted it to sunlight for half an hour, and through it photographed the spectrum quite down to the red. I was then satisfied, and promulgated this theory that actinism is a property of light resident in all the rays, and manifesting its force in the ratio of the vibratory motion or wave length, but not in an unbroken scale; and I believe that this is correct. I have never seen a piece of coloured glass yet that by its mere colour would not admit actinic light. It was a matter of time and quality, not quantity. Expose a sensitive film under it long enough and you will get actinism. The statement that actinism is in the ratio of the wave length requires some qualification. It was discovered that were the different-coloured rays mingled in some instances the action was peculiar. This may be best illustrated, perhaps, in the excitation of the auricular nerve by the action of the atmospheric waves. When atmospheric wave lengths of different rapidity excite this nerve a peculiar sensation is the result, which is defined as harmony or discord. This effect is never induced by a single wave length, whether slow or rapid. In the solar spectrum, where the different wave lengths mingle, there seemed to be an analogy with that of the atmospheric waves. Actinism at such points seemed to be retarded or accelerated according to the conditions of harmony or inharmony. Therefore we concluded that the theory of M. Edmond Becquerel was not founded upon fact; and that has been one of the reasons why I have always maintained the position previously stated.

Dr. Higgins: The fallacy that acceleration and not retardation is produced by blue glass is equal, in my mind, to the fallacy that emulsion—dry-plate photography—is not as quick as the bath process. I see it stated in books, and universally in print, that for dry plates you must give an exposure, some say of three, and some run up as high as ten, times that of bath plates. I would ask the Secretary, who is a bath plate worker, what is the usual time of exposure with him in his studio?

The Secretary: The time varies from one second to half-an-hour.

Dr. Higgins: I would ask further whether on that exposure of one second he has the development of all the intensity that he can desire?

The Secretary: Yes; and, in some cases, a good deal more.

Dr. Higgins: Do we understand that the majority of cases of exposure are on the one second or half-hour side?

The Secretary: I should say that the majority of my cases—not portrait work, of course—require an exposure of about fifteen minutes.

Dr. Higgins: On inquiring among the portrait workers I found the usual time is about thirty seconds. With emulsion photography the usual exposure in my room is never over three to five seconds. I present for view to the Section a plate taken this morning in a well-lighted room, but where there is no skylight, in which the exposure was less than one second; the cap was simply removed and replaced as quickly as possible. The developer was our President's, weakened with water sixteen times.

The President: There is intensity enough. I would say that to obtain such a result with a developer one-sixteenth the strength I ordinarily use would require sixteen times the exposure.

Dr. Higgins: That is to show the action of the light, not as a picture. It was held a foot from the window—a diffused light; not sunlight. A similar plate made by gaslight a foot from the flame was placed in a printing-frame. It was covered two-thirds, and exposed by counted time, thus—one, two, three. Here are the three exposures, just as quick as you could move them along; the whole three counts would not make a second of time. (Plate shown.)

The President: In reference to the new developer with the neutral oxalate of potash: I gave the formula to Mr. William Hudson, an amateur photographer, residing near Boston, Mass., to try on dry plates. In my experiments I had only used it on wet emulsion plates. I received a letter from him a few days since, stating that he had tried it on dry plates with the most satisfactory results; he had produced with it the finest negatives that he had ever made on dry plates, and had exhibited them to some experienced photographers in the vicinity, who had expressed themselves in the same way. In this connection I would say that I advised at the last meeting the use of acetic acid to acidify it. I tried tartaric acid and found that I got a stronger negative. The negatives I had made needed strength. They were very delicate, but were not up to the strength necessary for printing; but with tartaric acid I got greatly-increased strength, and all the other good properties at the same time.

The proceedings then terminated.

Correspondence.

WARM BLACK.

To the Editors.

Gentlemen,—Mr. Sórensen, a photographer in a little town here in Denmark, knowing somewhat of Mawson and Swan's endeavours in England, applied in the course of 1866 or in the beginning of 1867 to our Government for a patent for a certain kind of carbon tissue which he had invented. I subjected myself to his instruction, employing partly his tissue, partly tissue of my own production, quite comprehending that only a *black* material of carbon would be permanent. The refusal of the Government to grant Mr. Sórensen a patent for a branch of industry now well known by every Danish photographer, the difficulties in connection with a new method of printing, a total lack of materials and implements, and the care of my regular daily business, prevented my proceeding with the otherwise very agreeable undertaking.

Afterwards, when the improved carbon process was published by the Autotype Company in London I obtained from them an excellent sample of a carbon print in black—a portrait 24 × 18 inches—accompanied with a copy in purple, and the following remarks:—"We have sent you by post two specimens of an enlargement—one printed in black, as requested, and one in a photographic colour which is generally preferred." It is probable that this preference by photographers and their customers has from the beginning driven the new art into that dismal field where it now is.

I think it best to solve the question by turning back exclusively to the use of (warm) black tissue. All other pigments, we know, are untrustworthy, except, perhaps, ochre, which is vulgar and without lustre.

The characteristic tone of a carbon print should be a warm black, and it is a pity that photographers should have aped the fading colours of silver prints. All prints from engravings in steel, copper, wood, and stone are black (carbon), and nobody would prefer pictures of that kind in other pigments. We should no longer allow the art of carbon printing to be degraded as a slavish imitation of the "ghostly vanishing" of silver products.—I am, yours, &c., Peter Chr. Koch.

Copenhagen, April 27, 1878.

PRECIPITATING RESIDUES.

To the Editors.

Gentlemen,—The subject of collecting residues has appeared in your columns several times recently without any of the writers noticing the difficulty I have experienced in the slowness with which the precipitation takes place under some circumstances, the only place in which I have seen this difficulty recognised being in your "Answers to Correspondents," on page 106, where you recommend the addition of nitric acid to facilitate the precipitation.

I have observed a very simple way of producing this effect which I think may be useful to some of your readers:—I was on the point of throwing away a rather large collection of wastes which I had been putting aside in a dark cupboard for some months, and the chloride showed scarcely any signs of subsiding. At last I set the vessels containing it in a strong light, waiting to be thrown out when the precipitate settled down in a very few hours. I have since tried the effect of exposing to light chloride under precipitation, with the invariable result of the deposition being complete in an hour or two, when I pour off the clear liquid after trying if there be any further opalescence on the addition of more sodic chloride, and turn the deposit into a bottle large enough to hold all the moist silver chloride I am likely to collect in a reasonable time, and this, in its turn, has the clear part poured off occasionally. These two vessels are sufficient for the storing of a very large amount of waste.—I am, yours, &c., A. S. Elgood.

April 29, 1878.

Miscellanea.

Crookes's Radiometer.—In the *Photographisches Wochenblatt* Herr Fritz Haugk has an article on Crookes's radiometer regarded as an actinometer, in which, after giving an account of the instrument, he relates the following experiments made by himself:—It is, of course, known that under the influence of heat the radiometer revolves in a bell glass from which the air has been exhausted as much as possible by an air-pump; but Herr Haugk was unwilling to admit that this movement could not also be produced by the influence of light, and in such a manner that a certain number of revolutions of the radiometer should represent a certain definite quantity of light. Accordingly one day, when the light was very changeable, he took a sheet of freshly-silvered albumenised paper and placed it in a printing-frame, covering half of it with orange-coloured paper, and upon this covered half he placed his radiometer. As soon as the sky became quite clear he exposed the whole to the light until the radiometer had performed a hundred revolutions, the time required for the hundred varying from six minutes in the first experiment to ten minutes in the last of the three experiments. He then went into the dark room and placed the yellow paper over the half of the sheet of paper already printed, placed the radiometer upon it, and uncovered the other half. Then when the sky became overcast he gave three other exposures lasting each a hundred revolutions, and found in this case that the time required varied from twenty to forty minutes. The sheet of paper was then completely uncovered, removed from the frame, and examined, when it was evident that the piece of paper longest exposed had printed to a much greater depth than that which had been exposed only for a short time, while in each case the radiometer had made but three hundred revolutions. Thus the position that a revolution of the radiometer bears a definite relation to a certain quantity of actinic light becomes untenable. Herr Haugk does not go the length of saying that light has no influence upon the rapidity with which the radiometer revolves, but is convinced that it has but little, and that as an actinometer it is untrustworthy. He also thinks that it is not even very reliable as a thermometer. In these conclusions he is supported by the experiments which have been made by various British photographers, and Mr. Crookes himself is perfectly aware that the radiometer is more affected by heat than by light; but there still remains the difficulty of producing a really perfect vacuum in which to place the instrument. Lastly: Herr Haugk thinks that the radiometer loses its sensibility by degrees, and that in time it would almost lose it altogether.

The Chemical Actions of Light and their Electrical Relations.—Professor Dewar began his discourse at the evening meeting of the Royal Institution on the 29th March with experiments showing the action of a beam of the electric light upon two plates of silver, and the formation of an iodide of silver when they are subjected to the vapour of iodine—the first principle of photography. He then noticed the evidence of electric action, during the process, recorded by the galvanometer, in relation to which he alluded to the remarkable experiments of Becquerel and Grove. He next explained and illustrated the researches of Dr. McKendrick and himself on the electro-motive force generated in the human eye and the eyes of various animals, as observed by a very sensitive galvanometer, every source of heat being carefully excluded. There was a sudden increase of the force by the impact of light; during its continuance it fell to a minimum, and suddenly increased on the withdrawal of the light. The complexity of this physiological action induced Professor Dewar to undertake a series of delicate experiments, his object being to produce such a form of cell as would give large electric curves when filled with fluid substances sensitive to the action of light. He described different forms of the apparatus, and showed that an instrument exposing a fine wire no greater in diameter than a hair was as active as a large surface in true actinometry. Some of these effects were rendered visible to the audience by the movements of a small mirror attached to the needles of the galvanometer, which cast a spot of light on the screen. One of the compounds specially selected was the peroxide of chlorine—a most unstable gas, which, when subjected to light, decomposed into chlorine and oxygen with a slight explosion; and, by the Professor's placing it in connection with differential thermometers, it was shown that this gas might be used to form a very delicate photometer. Among other interesting experiments the Professor demonstrated the opacity of chlorine for all coloured rays of light higher in refrangibility than the blue, such as indigo and lavender, by showing the sudden increase of the volume of the gas when exposed to blue as compared with red and yellow light, which, in ordinary cases, produce expansion through the evolution of heat. In conclusion, Professor Dewar commented on a series of tables giving the minute results of a series of laborious and delicate experiments, made with recording apparatus exhibiting the varying results of the electric action of light on certain fluids of different opacity, and on the solution of various salts alone, or mixed with other substances. Future researches in the Institution will be prosecuted by means of a very fine galvanometer recently presented by Dr. Warren De la Rue, F.R.S., the chairman of the evening.—*Illustrated London News.*

On the Light Admissible for Preparing and Developing Plates.—The quantity and kind of light that is allowable in the preparation and development of dry plates is a subject which is of the greatest importance, and yet regarding which but very little care is usually taken. For wet-plate photography, or when silver bromo-iodide or iodide is employed, the requirements are not difficult though often neglected. In some dark rooms the ordinary flashed yellow glass is employed, and for certain work this is all very well, as it gives a subsequent and preliminary access to actinic light, which, as has been shown, is valuable in diminishing exposure in the camera. For plates prepared with these salts in which the exposure to this coloured light is likely to be at all prolonged, this kind of glass is objectionable and conducive to fog. In this case is to be recommended a deep orange glass, which is called "stained red." The light passing through it is of an orange tint, and not so deceptive to the eye as that which passes through flashed ruby. Paper dyed with aurine may be pasted over the ordinary yellow glass before mentioned, or the dye may be dissolved in varnish and applied, and this will be equally as effective as the stained red glass. For silver bromide emulsion much greater care is required in selection, since it is sensitive to a greater or less degree to the red rays. In this case the quantity of light is as important as the quality, more particularly when compounds are present which are sensitive to the ultra red, as is the case in some of the new emulsions. In this case if the dark room is to be lighted from the sky the glass must be of flashed ruby, and even this must be carefully selected. In examining most of this kind of glass by the spectroscope with a wide slit, it will be found that though the yellow is absorbed, yet a portion of the green light will be transmitted, and this is absolutely fatal to freedom from fog where a very sensitive emulsion is being manipulated. The ruby glass selected should show an absolute absorption of all rays but the red, and the amount of light admitted should be but small—in fact, only just sufficient to see the image. Perhaps the best light for these plates is artificial light—either a candle or gaslight, screened from the plate by a coloured globe or stained paper. For a covering of a globe there is nothing better than aurine and varnish, and aniline scarlet and varnish. One surface is covered with the one and the other with the other. The light penetrating through the two will be strongly coloured. If such a light be placed six feet away from the operator all danger of fog will be eliminated. For suppose that to get a transparency half a second is required at six inches distance from the naked flame, then we should require 144 half-seconds, or 72 seconds, at six feet to get the same result. When the most intense part of the rays are cut off we may say that it would require at least twenty times that exposure to get a perfect positive, or, roughly speaking, half-an-hour's exposure. It will be manifest that exposure to such a light for the short time required for the preparation or development of the plate will practically have no effect on the film, since when moistened with the developer it becomes much more insensitive than in its dry state.—*Photo. Journal.*

EXCHANGE COLUMN.

Wanted, in exchange for a Jamin whole-plate lens, a microscope with mechanical stage. Value adjusted.—Address, F. W. Evans, 246, Old Kent-road, S.E.

I will exchange a whole-plate portrait combination lens by Fleming, of London (Waterhouse diaphragm), for something more useful to an amateur photographer.—Address, A. Marchant, 3, Unity-street, College-green, Bristol.

I will give a Dallmeyer's No. 2 triplet, 10 inches focus, and a Dallmeyer's wide angle rectilinear, 3½ inches focus, for a portrait lens of from 6 to 8½ inches back focus, and half-plate camera.—Address, H. Paton, 59, Landressy-street, Bridgeton, Glasgow.

Dark tent of deal, size outside 3 ft. 6 in. × 4 ft. × 1 ft. 7 in., having two yellow glass windows, and two oxyhydrogen burners for mixed gases, will be exchanged for lantern slides—three-inch picture nursery tales, or designs for interchangeable chromotype frame preferred.—Address, C. J. Clark, 27, Maitland Park Villas, Haverstock Hill, London.

ANSWERS TO CORRESPONDENTS.

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

F. Gutekunst.—Received. Thanks.

P. (Helensburgh).—The subject shall receive our most careful consideration. Thanks for making the suggestion.

T. O. B.—There is nothing for it but the making use of a stout paper having a smoother surface than cartridge paper.

J. M. Danks.—We are about to try your plates against others that have been prepared by the same formula, and shall let you know the result.

W. P. (Dartmouth).—We have spoken to two or three makers, but they do not exhibit any enthusiasm in connection with the manufacture of the article.

Microphoto (Bristol).—The number to which you refer has been out of print for several years. Another having an article on the same subject will be selected and forwarded.

Quercus.—1. There are several photolithographers in London; at present, however, we do not know of the addresses of any.—2. See the articles on photolithography published in our Almanac for 1876.—3. Yes.

Clericus.—1. The book is not yet published.—2. Nothing but changing the sample of collodion, or adding an unusually large proportion of alcohol to the developer, will overcome the repelling action.—3. Thanks for kind expressions.

R. Price.—A little chloride of lime, together with the use of pumice-stone, will remove the stains. Few have a correct idea of the great value of pumice-stone as an agent in the removal of silver stains. We use it very much for this purpose.

T. Riley.—The matter is one altogether beyond our province; but we presume that you have received the expected reply before this. There is every excuse to be found for those who have of late been depending upon unbroken sunlight.

Semper Vigilans.—During the months of July and August last year we published a few chapters on *Single Transfer*, from a perusal of which you will obtain very full information respecting that phase of carbon printing upon which you write.

Norman May.—We think it probable that the album shown at the meeting in question is one for which a patent was obtained about two years since, and which is described at page 422 of our volume for last year, under the name of *Prince's Patent Kaleidoscope Album.*

J. Latham.—See our answer to "T. O. B." in our issue of April 19, coupled with that to "L. D." in the number for April 26, and on a cognate subject to "chromotype" in that of April 12. All these have reference to the presence of minute air-bubbles imprisoned between collodion and gelatine films.

A. B. G.—One of the simplest hygrometers, as it is certainly the best, consists in that arrangement of two thermometers known as the wet and dry bulb thermometers. The one that is covered by muslin, which is kept moist by capillary attraction from a water-bottle, is always a few degrees lower than the dry bulb thermometer, and the difference between their readings indicates the degree of moisture in the atmosphere.

Rev Geo. White.—We cannot advise you to produce your binocular views for the *reflecting* stereoscope, because the *refracting* instrument is so much more convenient and satisfactory in every way. We quite admit that in a reflecting stereoscope pictures of even two feet square may be examined. But what then? They will not subtend a greater angle when examined by reflectors than will a three-inch picture when scrutinised through a lens having a focus of five or six inches; and, as the sensation of magnitude is dependent upon the angle anything subtends to the eye, where would be the gain? Always remember that a binocular picture when examined in a refracting stereoscope is *magnified.*

F. S. K.—A somewhat singular kind of phenomenon in connection with the preparation of a gelatino-iodide of silver has been experienced by a correspondent, who describes the occurrence as follows:—"Having been in the habit of using in gelatine emulsions a little iodide for landscape work to prevent blurring, and wishing to make a stock of pellicle which should be available for either portraits or landscapes, I made some with bromide and iodide separately, intending to use the former *alone* for portraits, and a combination of the two in certain proportions for landscapes. I found the bromide pellicle dissolved easily. The iodide pellicle also *swelled* easily, but refused to dissolve—long continued heat only causing a slight solution. Can you tell me the cause of this? How am I to rectify it?"——Not having experienced such an occurrence we submit it to our readers.

J. L. B.—Our meaning is not that an instantaneous negative from other than a portrait lens will not bear enlarging from in any degree, but that, owing to the greater amount of light admitted by a portrait lens when working with full aperture, an instantaneous picture can be better taken by such a lens than by any other. We are unable to express any opinion as to the rapidity of the lens you have obtained; but this point can be easily tested by taking a street view in which there are a number of moving figures, and comparing the length of the foot (of any passer by) which is above the ground and moving forward with that which rests upon the ground. If there be *much* fuzziness about the moving foot, reduce the exposure by increasing the strength of the spring by which the trigger-movement-shutter is impelled. You quite correctly apprehend what was said about the radius of the plano-concave lens; but this curvature also depends upon the kind of lens to which the corrector is to be applied.

Received.—*The Magazine of Art*, Part I. (Cassell, Petter, and Galpin); Thornthwaite's *Hints on Reflecting and Refracting Telescopes; The Annual Report* of the Royal Cornwall Polytechnic Exhibition; *The University Magazine* for May; Samples of "Swan," "Bennett," and other dry plates. Notices of these in our next.

W. L. R.—On the subject of cleaning old glass plates our correspondent writes:—"I should be glad if you would inform me whether you think there is any 'best' process of cleaning old glasses which are intended to be used again. I will detail my own method, and if you can suggest any more thorough process than my own you would oblige me, as I find unless I albumenise my plates (after the usual cleaning) that in an under-exposed picture the shadows are often 'smeared' and dirty, and sometimes I can even trace the direction in which the cleaning cloth has traversed the plate:—I soak the plates in a strong, cold solution of washing soda until, on lifting them out, the film is so loose as almost to be left behind. I then rub each plate with my hands on both sides, wash the batch, each separately, three or four times under the house-tap, and then wipe with linen cloths which have been boiled to extract soap or soda. I now leave them on a shelf till required either for use or coating with albumen, when I proceed as follows, using one of the three following—tripoli, old collodion, or ammonia. Lately I have used the collodion most:—Place the plate in a holder, and rub thoroughly with cotton wool containing the cleaning medium, traversing the plate all over twice. Rub well with a clean linen cloth, and polish with wash leather—each kept for the purpose. But after all this I cannot depend on the shadows being clear; instead of detail in an under-timed one I get smears. Albumen gives clean shadows, but I do not want to be dependent on this. Any information would oblige."——In reply: our correspondent has proceeded in a very thorough and excellent manner to clean his old plates; but there is a still better method—one, indeed, which, in reply to his first query, we do not hesitate to designate as the "best" process. It is one that was introduced by Mr. M. Carey Lea a number of years ago, and which is extensively used throughout the world. The following account of it is given by Mr. Lea himself, in his valuable *Manual*:—"Provide a large glass pan, in which make a mixture in the following proportions:—

Bichromate of potash	2 ounces.
Sulphuric acid	3 fluid ounces.
Water	25 ,,

Place the plates of glass in the pan alternately, one at each end, so that their ends shall overlap a little, and allow the free passage of fluid between them. For new glass half-a-day will be sufficient to destroy the greasiness. Old glass that has been used before should have a day, and, if it has been varnished, even longer, or a mixture containing only half the above proportion of water. So long as this bath is yellowish-brown it is active. When it acquires a violet colour it is spent, and will want renewing. After a suitable immersion in the cleaning bath place the glasses one by one in a water faucet, and as fast as the water fills the pan lift one end and empty it. Repeat this half-a-dozen times at least. Then take up the first plate, let the stream of water run some seconds—first on one side, then on the other—until every possible trace of the cleaning bath is removed, and then rub dry with soft blotting-paper—*not* with cotton rags, as so universally directed." We have given Mr. Lea's remarks at length in the belief that they will be appreciated by those who have not seen the excellent *Manual* from which they are extracted, copies of which may be obtained at our Publishing Office.

Improvement in Lanterns.—When we described, in our number for November 30, 1877, the new "refulgent lamp" for the magic lantern, for which Messrs. Newton and Co., of Fleet-street, had obtained a patent, we did not specifically allude to one of its features—one, indeed, which it shared in common with all lamps of the same *genus*—namely, that of possessing *two* wicks. Since that description was written—indeed within a very recent period—Messrs. Newton and Co. have added a third wick, with the gratifying result of an important increase in the luminousness of the disc—a result of which we are able to speak in a decided manner, as we have subjected the disc to a careful examination. Owing to the fact of the wick-surface being small, the heat arising from the flame is by no means great, while the combustion is perfect.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For the Week ending May 1, 1878.

These Observations are Taken at 8.30 a.m.

April.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
25	29·86	NE	47	50	61	44	Cloudy
26	30·04	NE	44	47	61	42	Cloudy
27	30·21	NE	46	50	65	42	Fine
29	29·96	E	49	54	66	46	Cloudy
30	29·64	SE	55	57	69	51	Dull
May. 1	29·61	S	55	58	68	54	Dull

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／THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 940. Vol. XXV.—MAY 10, 1878.

REVERSING THE NEGATIVE PROCESS.

Once more we find the wheel of time bringing round to us an old, old process which, though long since tried and relinquished, now makes its reappearance as a novelty. We allude to Herr Obernetter's "reversed negative process" described in our last number. As old as the collodion process itself, the idea of sensitising a collodion containing a soluble silver salt by immersion in a bath of soluble haloid has long since given place to the method now generally followed, in which the conditions are reversed; but, though for various reasons the former plan was found in years gone by to be inferior to the one which replaced it, there is no reason why, at least for special purposes, it may not be found to possess at the present day advantages which may render it convenient.

Numerous instances may be found in the history of our art-science of processes or formulæ which have been tried and set on one side, if not as impracticable, at least as offering no advantages over alternative methods already in vogue; but as years go on and our knowledge increases, or as our requirements become changed, these rejected processes crop up again as novelties and are received into general use. Such may possibly be the case with the one under notice; for, although we are not prepared to accept it in the light in which its author places it before us—namely, as a substitute for emulsions—we can readily believe that under the special circumstances for which he recommends its use, and in view of the advantages he claims for it, it may find a place amongst our established processes.

At the same time, as regards the mere facility it affords for the colouration of the collodion film in the manner suggested by Herr Obernetter, we fail to see that it offers any advantage over an emulsion, or that the difficulties involved in the preparation of the latter are sufficient to justify us, even for the special purposes mentioned, in relinquishing its use. For general work, landscape or otherwise, the practice of staining the film has now, we believe, fallen into disuse, as any slight benefit which may accrue from such treatment is found to be more than counterbalanced in other directions. But in the particular branch of photography to which allusion is made in Herr Obernetter's article—the production of negatives for colour printing—we believe we are correct in stating that both MM. Leon Vidal and Ducos du Hauron largely employ stained emulsion films.

But, turning to another phase of the question, we think a considerable modification of the formula will be necessary before the highest class of results can be obtained. It will be noticed that Herr Obernetter recommends the same collodion—that is to say, a collodion containing the same amount of silver nitrate—to be used independently of the action of the "sensitiser," whether it be iodide, bromide, or a mixture of the two. Now we know that in the ordinary bath process the conditions necessary to be observed in iodising or bromising the collodion are respectively very different; we may, for instance, bromise the collodion to an extent which would be quite inadmissible in the case of iodide, as the physical character of the silver iodide and the greater rapidity of its formation cause it to "burst" out of the film, or to form loosely on its surface, much sooner than is the case with bromide. And, again: it is possible to work a purely iodised collodion with a bath of silver nitrate containing only thirty or twenty-five grains to the ounce, whereas a bromised collodion requires at least double that strength in order to give a satisfactory result.

Such being the facts in the ordinary method, it is but reasonable to suppose that in reversing the process the same rules will, to a great extent, hold good; that, in fact, if a collodion containing a given quantity of silver gives the best possible results when converted into an iodide film, the proportion will require to be largely increased in order to render it workable to the best advantage when bromised. If we analyse Herr Obernetter's formula we find that his collodion contains, roughly, five and a-half grains of silver nitrate and six and a-half of pyroxyline to the ounce. Now, if we suppose the whole of the silver contained in the film to be converted by the haloid bath, we shall find that the treatment with iodide produces a film as nearly as possible equivalent to one obtained in the ordinary way from a purely iodised collodion containing a little more than four and a-half grains of iodide of ammonium to the ounce; while, if bromide be used, the result would be equivalent to an emulsion prepared with a fraction over *three grains* of ammonium bromide. If we compare these figures with the formulæ in vogue for iodised and bromised collodion we find a great disparity; for, whereas the iodide is about the usual mark, the bromide might, with advantage, be increased to double or even treble the quantity.

We direct attention to these points, not with a view of showing that Herr Obernetter's method is impracticable, but rather to demonstrate in what manner it may be made to satisfy ordinary requirements. That gentleman, in fact, closes his article by recognising the possibility of improving the process by varying the formulæ, and having had some experience with silvered collodion we may be allowed to say a few words on its capabilities.

First, as regards the quantity of silver it is possible to introduce into the collodion in a state of solution. Contrary to pretty general opinion silver nitrate is very soluble in alcohol of ordinary strength, especially when heat is employed to assist the solution; even in absolute alcohol at boiling point it is stated to be soluble to the extent of twenty-five per cent. by one authority. The admixture of ether, as in collodion, limits the solubility considerably, but still leaves it, when proper precautions are observed, fully sufficient for any purpose, emulsion or otherwise. There is not the slightest difficulty in introducing twenty grains of silver to the ounce of collodion, and at that strength it will, with most samples we have tried, remain in solution without crystallising on cooling.

The way we proceed is as follows:—The collodion is prepared in the first instance from solvents as free from water as possible, as this admits of the use of more of the latter in getting the silver into solution. Ether and alcohol of ·725 and ·805 respectively are quite good enough. The silver is soluble *theoretically* in half its weight of boiling water, but practically even a less quantity of water suffices. If it be dissolved, then, in as small a quantity as will suffice, and three or four times the quantity of alcohol *previously raised to the point of ebullition* be gradually added, the solution may be transferred to the collodion without the slightest risk of precipitation, even when working, as we have said, to the proportion of twenty grains to the ounce. With some samples of pyroxyline it will be found that after standing an hour or two the collodion becomes opalescent or decidedly opaque, presumably from the formation of minute crystals of silver nitrate, but the precipitation takes place in so fine a state that the mixture partakes of the character of a perfectly smooth emulsion. If methylated solvents be employed a faint discolouration of the silvered collodion takes place after a short time, but this disappears entirely upon the addition of a soluble haloid; it is safer, therefore, or we may say necessary, to add one minim of nitric acid to each ounce of the collodion, in which state we have kept it satisfactorily for several weeks.

We have for some time practised this method of sensitising our ordinary bromide emulsions, for which purpose it seems eminently adapted, as a larger body of silver bromide can be thus introduced into the emulsion without fear of precipitation than when the opposite course is pursued. It is equally suited to Herr Obernetter's process, all that is necessary being the arrangement of the proportion of silver to suit the altered requirements. In thus preparing a bromide emulsion there is, however, one precaution to be observed, namely, not to add the bromide too rapidly, *especially when approaching the point of neutralisation*. So long as there is a considerable excess of silver the bromide forms rapidly and in a state of extremely fine division; but as the point of saturation is reached, if extreme care be not observed, it will separate in "flocks," leaving the collodion perfectly clear. But should this occur it is only necessary to add a fresh portion of silvered collodion and shake vigorously, when all will come right again; then proceed to neutralise more carefully.

We have, however, derived the greatest use from this reversed method in the preparation of emulsions containing a trace of iodide As all our readers who have gone through the preparation of bromo-iodised emulsion will be aware, the presence of free silver appears to be necessary to prevent the precipitation of the iodide, and, in spite of every precaution, the behaviour of the emulsion is sometimes most refractory. In such cases we have allowed the emulsion to "ripen" in the presence of an excess of silver, and have then poured it out, and, after allowing it to set, treated it with a weak solution of soluble haloid, preferably bromide, as the desensitising action is then less than if iodide be employed.

In conclusion: we can only say that Herr Obernetter's paper comes as a valuable suggestion of what may be possible in the direction of silvered collodion. Not having yet tried his process in its entirety we are unable to speak of its capabilities; but we are of opinion that while for reproductions and for other purposes where extreme rapidity is not sought for it will form a ready means of securing the object without the necessity for any very delicate manipulations. When, however, rapidity is a desideratum it will, we think, be necessary to resort to a second sensitising—a condition which deprives the process of much, if not all, of its simplicity.

RECENT IMPROVEMENTS IN CARBON PRINTING.

It is still fresh in the recollection of our readers that Mr. J. R. Johnson recently obtained a patent for certain improvements in carbon printing which, with the exception of one, or possibly two, points that were to have been disclaimed are now being brought into practical if not commercial existence. As the outcome of these inventions we have received from Mr. Johnson a variety of pictures which bear the imprint of Mr. Sarony, of Scarborough, with whom, we understand, Mr. Johnson has been engaged for several months in carrying out the details of his inventions.

In Johnson's patent special attention is directed to the fact that when a large proportion of the permanent alizarine is added to carbon tissue the staining of the paper (single transfer being presumed) upon which the print is to be developed introduces an element replete with serious annoyance to the photographer. From what cause this arises we know not, but we are very well aware that the staining alluded to really does take place, and we have frequently been asked by correspondents if we could account, and provide a remedy, for such an element of disturbance. A remedy is well known, namely, the addition of such a quantity of freshly-precipitated alumina as will render the alizarine completely insoluble—in other words, which will produce one of the alizarine or madder lakes so well known to artists, some of them since the time of Rubens. But, unfortunately, the remedy is as bad as the disease; for the aluminous base of the lake renders the gelatine as completely insoluble as does the oxide of carbon formed by the action of light upon the bichromate in the carbon tissue. Mr. Johnson claims, after a series of experiments extending over a long period, to have succeeded in forming an alizarine lake free from these defects, while it yields a rich and brilliant pigment by which all the photographic tints can be produced. Into the mode of effecting this we do not enter, preferring to refer the reader to the specification of the patent, which we published in our issue of November 9th, 1877. The specimens now before us fully bear out what has been claimed, the whites being singularly pure and the general tone very rich.

The perfection of single transfer printing is to be found in its application to opal glass. In purity and beauty such pictures quite rival the finest vitro-enamels. Compared with similar pictures on paper the latter are coarse and granular, arising from the fibrous texture of the paper being seen below. We have already called attention to the advantages that would arise from the employment of a fine, highly-glazed paper; and in Mr. Johnson's patent this has been carried a step farther by the employment of a paper prepared with an enamel surface that has special properties, namely, that unlike the paper referred to by Dr. Monckhoven, and which, owing to the presence of bartya, took a permanent stain, this is free from that defect, being prepared with materials which do not combine with chromic acid, details of which are to be found in the specification to which we have already referred. The prints forwarded to us in illustration of this feature are certainly very fine, possessing a freedom from texture peculiar to a vitro-enamel, with the purity of whites already spoken of in connection with the previous portion of the patent.

The eburneum process at one time (now several years since) evoked a large amount of sensation among photographers. It was the invention of the late Mr. Burgess, of Norwich, but, owing to the heavy smudginess of the tones and the silver basis, few cared to adopt this process in everyday practice. Mr. Johnson and Mr. Sarony have taken it up and worked it by the light of modern knowledge, and especially by that of carbon printing as described in Mr. Johnson's patent. The appearance presented by the modern specimens, compared with those by Mr. Burgess, is very marked in the contrasts. The latter are hard and possess an inky-black tone (we speak of those sent to us by Mr. Burgess, and which we noticed at the time), while those by Mr. Sarony and Mr. Johnson are delicate and transparent, the tone being warm and the permanence undoubted. We are informed that the chief advantage claimed in connection with these "ivorytypes"—as Mr. Sarony prefers to designate them—consists in preparing the artificial ivory in large sheets and in advance, so that these beautiful prints can be produced as easily and as expeditiously as an ordinary double transfer print. Further: these pictures, although possessing a highly-glazed surface that can neither be scratched by the nail or injured by a wet sponge are, nevertheless, produced without coating with collodion the glass upon which they are developed. The impression we receive from this is that a considerable saving of time and money must result from the working of this new eburneum or "ivorytype" process.

In working out these practical details, Messrs. Johnson and Sarony are said to have discovered the source of the great variations in the manufacture of carbon tissue which has hitherto rendered it a matter of difficulty to obtain two samples equal as regards colour, solubility, and other qualities. This we are very glad to learn. Carbon tissue makers have hitherto been troubled by every passing thunderstorm. Ajax-like, these experimentalists may now defy it.

RETOUCHING SUBSTITUTES.

It is perhaps rather a contradiction to speak of a substitute for retouching, considering that before retouching existed "substitutes" were in vogue; but we wish to examine the question thoroughly, treating of methods which have been invented or theorised upon, since the advent of the pencil has revolutionised the practice of portrait photography. Indeed, it is not too much to say that the practice of protraiture has been revolutionised by the process of freckle extermination, for which is so frequently substituted likeness and character extermination.

We tread on dangerous ground, we are aware; but we do not intend, in what we are about to say, to speak in a partisan spirit of any part of the practice of "*la retouche*," which is at present a great and recognised power. Still we may allude to its abuse while treating of its use, for scarcely a day comes but we see some examples; and hence we are not surprised to notice the various nostrums brought forward as substitutes—efficient, and economical of time. Retouching properly employed has its artistic aspects, and here is the old story—art by machinery or process.

Retouching is found so costly in many a studio that the salary of the *employês* engaged only upon it has made all the difference between a profit and a loss, and this is another reason for attempting to find out something to replace it at a lower cost. Consequently we find that modification of the light occupies a prominent position in the recommendation of the substitute advocates, and very remarkable are their statements.

There is at present a heated discussion going on in the American societies about the merits of blue glass as bearing upon this question, and one side confidently avers that by its use the need for retouching is reduced to a minimum, that freckles and wrinkles show less, and that the whole face comes up with greater roundness and modelling. We cannot admit that anything of the sort would happen by the substitution of glass of any colour in the studio for the time-honoured "colourless" sheets that are used in almost every studio in this country. We consider it to be impossible that any colour modification of the light can alter the relative intensity with which a patch of red or a freckle, for instance, is represented, compared with the surrounding flesh tints.

We are, however, of opinion that as it is rare that there is smoke without fire, the conflicting testimonies may be explained in a rational manner, without imputing either ignorance or wilful perversion of facts to their originators; and quite recently a case was brought under our own notice which gave us, as we thought, the key to the whole matter. Having been invited to see a newly-constructed studio, in which already active work was going on, we were struck by the absence of blinds overhead, and we asked the photographer whether he did not find it to work with too heavy shadows. He pointed out to us a portable screen which we had not before observed and showed how it could be made to cast a shadow or diminish an undue preponderance of light in any direction. It was made after the fashion described in these pages some months ago, and we were assured was found a valuable adjunct. But what most struck us was the gentleman's remark that the yellow calico it was covered with had such a modifying effect upon the light that it did away with a good deal of retouching. Here was a personal example o the very argument we have condemned, and an able photographerf the exponent. It was, we confess, rather staggering; for of the ability of the photographer, both as a retoucher and a manipulator, there cannot be two opinions; we, however, soon got to the bottom of the matter, and saw the little bit of fire from whence came all the smoke.

When a portrait is taken with no blind and no reflector it is evident that there would be such great preponderance of top light that the lower shadows of the face would be very obtrusive, and that a large part of the face would be in half-shadow. Further: without the screen the exposure would be timed for the higher lights, and if correctly done there would be a large part of the face in the very condition which would give prominence to colour inequalities, such as freckles; for we need not draw attention to the fact that they always show most on the under-exposed portions of the face, and are scarcely seen at all in an over-exposed picture. And, again, the shadows would be lightened by the use of the reflector—and so, in truth, less retouching would be required, the work expected of, or performed by, retouchers in some establishments in the direction of modifying over-heavy shadows alone being most considerable. We think we have here offered a completely satisfactory solution of the puzzling problem of the contradictory effects ascribed to coloured lighting. In the majority of cases the coloured glass would be put in the very position where it would prevent the casting of heavy shadows, and so would tend to the production of such harmonious negatives as would consequently need less work with the pencil.

In one of the continental cities there is a celebrated lady photographer who is noted for the delicacy of her portraits, and we have been positively assured by more than one of our friends who have visited her studio that before photographing the sitter she thoroughly well *paints* the face, the eyebrows, &c. Here is an example of the oft-named plan of "powdering" the sitter before photographing to eliminate all imperfections in the texture of the skin. We, however, unfortunately have not been informed of the extent of the *modus operandi* of the fair operator's exploits with the palette and brush upon her sitter's face; and we are strongly of opinion that it is not the face generally which is treated, but special portions, such as the eyebrows, the parting of the hair, and many little special excrescences, or too great amount of local colour, which are heightened or reduced in effect, as the case may be, by a hand trained by long practice.

We allude to this because of the very persistent manner in which the face-powdering process has been recommended. We have in many cases experimented with it, but with most decided failures. No matter how carefully and delicately we attempted to cover the whole face with violet or other powder we found the result in the camera was that the face had a disagreeable, uneven, chalked appearance that was most unsatisfactory, though when a coloured powder was used the results were much better, but still practical failures.

One professional photographer to whom we mentioned our trials and their results entirely coincided with us, and said that his own attempts in a similar direction enabled him to find out the cause of some failures that had often puzzled him in the course of his practice. He had occasionally found a face to come out wanting in harmony in a peculiar way, and no rearrangement of blinds would make any difference. After his trials with the face-powdering process he discovered that these failures arose from his sitters having powdered their faces in such a skilful manner as to prevent his noticing it, with the annoying result alluded to.

It has been suggested that as the minute, downy covering with which the face, in common with almost every part of the human skin, is protected was repulsive to dust, it would be better to lay the colouring or covering matter by means of a liquid. Of course there are some sitters whose vanity would lead them to suffer any amount of inconvenience for the sake of appearing "beautiful for ever" in their pictures, but we must say that we cannot recommend any such process. To say nothing of the impractibility of painting subjects like this with a reception room full of impatient sitters, it must be ever borne in mind that the dexterous retoucher can take out everything necessary, and even produce any amount of flat, objectionable "finish' desired. In the case of a stray sitter such experiments might be tried by the *dilettante* photographer, but for all professional and practical purposes we are strongly inclined to advise that they be left alone.

Recent attempts to find a convenient and suitable substitute for glass in outdoor operations have not only demonstrated the possibility of success, but have also tended to stimulate the popular desire for some modification in this direction. The chief requirement, of course, is that, while saving the great weight of glass and freeing us from the dangers which arise from its fragile nature, the results obtained shall be in no respect inferior. This condition is undoubtedly fulfilled by Mr. Warnerke's tissue, but, especially amongst amateurs, there exists a large class who are not satisfied with any process which they cannot carry out themselves in its entirety; and, though the fullest details of the preparation of the tissue have been freely made public, it must be owned that the process is not one which can be conveniently worked upon an "amateur" scale. We have recently read a description of a simple method which appears likely to meet the wants of the class we speak of. It is due to M. Laoureux, a member of the Liege section of the Belgian Photographic Association, who describes it as a process "without anything new in its details, but constituting collectively a real novelty." The substitute consists of paper or cardboard waxed in the ordinary manner and then rubbed with powdered talc, as frequently recommended in connection with glass. To collodionise it it is laid, by means of the squeegee, upon a sheet of glass, a little larger than itself, previously moistened with alcohol. The preparation of the "plate" is completed in the usual manner, when the flexible tissue detaches itself from the glass support and may be stored away in a book or case. If paper be used it will be necessary to expose through a sheet of glass, but a tolerably stiff cardboard does not require this. The latter must not, however, be too thick, or it will not dry flat. The development is performed in a dish or on a glass plate, as may be most convenient. When completed the negative is accurately levelled and coated with a solution of twenty parts of gelatine and two to four of glycerine in one hundred of water, and allowed to dry. It may then be detached with the greatest ease from the paper or cardboard support—an operation which offers not the slightest risk of failure. The process appears to be of the utmost simplicity, and if the cardboard support can be prepared in such a manner as to resist the action of the developing solutions, so as to render its re-employment possible (*à la* Sawyer's flexible support), it promises to go a long way in driving glass out of the field.

ON THE CALOTYPE PROCESS.

[A communication to the Bristol and West of England Amateur Photographic Association.]

The calotype process of taking negative photographs on paper has become quite obsolete and a thing of the past; but it is a question whether its being so readily abandoned for the collodion process was not a great mistake. A very considerable experience in both processes in this country and in India warrants my giving a decided opinion that the paper process has some advantages over the collodion for a certain set of subjects.

The superiority of the collodion process for portraiture and for stereoscopic and microscopic subjects is unquestionable; but for landscapes of a large size, for foliage, for architecture where the carving or tracing is not very minute, and particularly for copying sculpture and inscriptions, I consider the paper process capable of giving all that can be desired. The definition, though not quite equal to that on glass, is sharp enough, and the absence of extreme sharpness in many subjects is desirable in an artistic point of view.

It has been urged that paper will not give objects at a distance with any distinctness; but my experience goes to prove that distant objects are, as a rule, rendered better on paper than on glass, from their not being liable to obscurity through solarisation so much as is the case with collodion negatives. I have paper negatives, taken in India twenty years ago, giving objects very clearly at distances from four to twenty miles, so that this objection is groundless. To show that prints from paper negatives are not very far below those from collodion I may mention that on my return from India, in 1863, I sent a number of prints from paper negatives to an exhibition in London, where they were mistaken for prints from collodion plates, and pronounced very beautiful, but not quite equal to the ordinary collodion pictures. When it was represented that the prints were from paper a prize was awarded. Moreover, a collection of prints from my paper negatives sent by Government to the Paris exhibition gained a medal.

The rage for portraiture, the little appreciation shown for landscape photography, and the collodion process presenting fewer difficulties, I believe, constitute the principal reasons for the paper process having been so soon abandoned for the collodion process. With the latter the iodised surface was obtained ready prepared and was easily applied; whereas good paper was difficult to be obtained, and when obtained the process of iodising the surface was one of great nicety, neatness, and delicacy of manipulation.

The one great drawback to the paper process is the long exposure required; but even this has its advantages in allowing more detail in the shadows to be brought out than can be done with short exposure. In this country and on the western coast of India the average exposure with a four-inch landscape lens was three minutes; but away from the coast of India, in hot and sandy districts where the radiation from the ground was great, the thermometer varying from 80° to 85° between nine and ten a.m., the exposure was as high as twenty minutes. Against this, however, the portability, freedom from risk of breakage, scratches, &c., are advantages which are of great weight, particularly with negatives of a large size. I found what was called the waxed-paper process—viz., waxing the paper before iodising—a decided failure. The negatives produced were always woolly and indistinct—the result, I think, of the texture of the paper having been disturbed by the removal of the size and the application of the wax. I have never seen any really good negatives produced by the process. The process I found to answer best was the following, which I got from Mr. Buckle, of Leamington, from whom I had one hour's instruction, and I have never seen any photographs superior to those taken by Mr. Buckle:—

Having procured suitable paper—in which the size should be hard, the surface smooth, the texture close and even, and the body free from metallic particles—I cut it up into pieces fitting exactly the negative frames, marking the smooth side of each in one corner with a cross in pencil. I had several boards made of deal one inch larger every way than the negative paper, the front of each board covered with fine flannel over a thin coating of cotton wadding, and at the back a loop of broad elastic large enough to admit the hand to hold and manipulate the board easily. Over the flannel I laid a sheet of clean, white blotting-paper the size of the board, and then pinned a piece of paper, to be prepared, on the blotting-paper, to the flannel with silver pins made for the purpose, and one and a-half inch long, the pins lying almost flat on the board. Then with a Buckle's brush (which consists of a glass tube four inches long and half-an-inch in diameter, and a silver wire hook which draws a tuft of clean cotton wool partially into the tube, leaving a ball of wool outside, which with a little care can be made into a perfect shape by pulling the superfluous cotton away) I applied the following solution to the surface of the paper evenly and gently, without disturbing the surface of the paper, but working it over several times lengthways and crossways, namely—

Nitrate of silver	33 grains.
Distilled water	1 ounce.

This sheet was then left on a table or flat surface while a second piece was similarly treated. The pins were then removed from No. 1, and the paper taken up by two corners and placed on a table covered with a clean sheet of blotting-paper, face uppermost. Then No. 3 was prepared, and the pins removed from No. 2, &c., and No. 4 prepared. When six or eight had been thus treated No. 1 would have become surface dry, or like a newspaper just out of the press, and would be ready for the next process—that is, of immersing in a bath composed of—

Iodide of potassium	20 grains,
Distilled water	1 ounce,

turning it over and removing air-bubbles on the iodised surface and back with a soft camel's-hair brush. After a minute and a-half or two minutes the sheet would be ready to be removed into a bath of rain water, the water being changed every half-hour for three hours, and so on till the six or eight sheets were completed, and then another batch proceeded with.

After three hours the papers were removed carefully (being very tender) and thrown over a piece of broad tape suspended across the room, and covered with strips of white blotting-paper, the papers being face upwards on the blotting-paper, and placed cornerwise so as to drip from two corners. When dry they were taken down and pressed flat, care being taken not to finger the surface, and if kept in a dry place they would keep good for an indefinite time.

When required for use the iodised surface was rendered sensitive thus:—The paper was pinned, as before, on to the board over blotting-paper, and parts of the following solutions A and B applied to the iodised surface with the Buckle's brush plentifully, evenly, and quickly in the dark:—

Solution A.

Nitrate of silver	50 grains.
Distilled water	1 ounce.
Glacial acetic acid	10 drops.

Solution B.

Saturated solution of gallic acid.

Take of solution A	6 drops.
,, ,, B	6 ,,
Distilled water	120 ,,

(In very warm weather 180 drops of water.)

After exciting one piece, the pins were removed from the corners, and the board with the paper still on it allowed to remain on a flat surface while a second piece was excited. Then all the superfluous liquid was blotted off the first piece with a piece of clean, white blotting-paper, and the sheet placed in the negative frame. The second piece was then blotted off and placed also in the frame, and the frame screwed up tightly. The double frames used were not hinged, but the inner surface of one half grooved, the other carrying a corresponding projecting ridge, and fastening together with four screws. The glasses were not cemented as usual, but lying on beds of sheet india-rubber. There was thus no fear of breaking the glasses in screwing the frames together, and the papers were kept flat and airtight. Paper excited at nine or ten o'clock at night was generally exposed and developed before twelve o'clock the next day.

The development was as follows:—The negative was pinned on the board over clean blotting-paper, and equal quantities of solutions A and B were applied with a clean Buckle's brush quickly and evenly over the surface, which was kept till wetted in every part. When the detail of the picture was well out, but wanting depth, some of solution B alone was poured on to the picture, and quickly distributed all over the surface with the brush, and the same was repeated until no more would develope. Then the negative was removed and plunged *quickly* (or stains were likely to appear) into clean rain water, and left in this till it was convenient to fix it and remove the iodide of silver in a bath of strong hyposulphite of soda, the negative being kept in this bath till all yellow colour was quite removed. It was then placed in rain water and well washed for several hours. After this it was placed in a bath of hot water, as hot as the hand could bear, for half an hour, to remove the size and render it capable of taking the wax properly. It was then hung up to dry.

When dry the negative was placed, face downwards, on several thicknesses of white blotting-paper, and a hot box iron run over the back. The iron was held in the left hand, and its course followed by a cake of pure white wax held in the right hand, and the wax rubbed on to the negative, which was hot enough to melt the wax. When the wax had been applied as far as required the negative was turned over, and the iron run quickly over the face to draw the wax through the paper. The negative was then placed between two pieces of blotting-paper, and all superfluous wax taken off by passing the iron over the blotting-paper. The negative was thus finished and ready for printing from. Thos. Biggs, *Colonel R.A.*

REPRODUCTION AND ENLARGEMENT OF NEGATIVES BY THE COLLODIO-EMULSION PROCESS.

[A communication to the South London Photographic Society.]

Reproduction of Negatives.—Photographers, at times, are at their wits' end to know how to get off prints in large numbers from a single negative, and failing to do so a great deal of business is entirely lost. Sometimes it may be a portrait of some celebrated person, at other times a landscape; and we all know that, if in dull weather a publishing order be given by one of the wholesale houses, unless we have some means of reproducing the negative it is quite impossible to execute a large order when pressed for time. I have seen many attempts made, and have made many myself, with the bath process, but I have never seen a result produced that would compare with a proof print from the original negative.

Some few months since a well-known firm had an order to execute, and I was asked if I could reproduce some negatives so as to get the number of prints completed by a given time. I set to work and reproduced several, which gave great satisfaction, and thereby the firm were enabled to execute their order. I now submit for your inspection a proof from the original negative, and also a proof from the reproduced one. The method I adopt is by no means a difficult one, which I here give in detail.

The first thing to do is to produce a transparency as perfect as possible. I always find it best to use patent plate, and after this is well cleaned it is edged with india-rubber solution for about one-eighth of an inch all round; it is then coated with washed emulsion and allowed to dry. I use an ordinary oak printing-frame with a thick plate-glass bed plate, similar to that I have here. I then get a piece of six-sheet card or mounting board large enough to fit in the printing-frame, and then lay the original negative down on it, marking round it with a mount cutting knife. After removing the negative I cut out the centre, which is the size of the negative; when that is removed the negative will fit in tightly. If this mask be not used the transparency will have a halo all round the edge for about a quarter of an inch, and sometimes half an inch, according to the subject. When the negative is in the mask I very carefully dust it with a stiff brush, a flat hog's-hair varnish brush being best. I then, with great care, bring the two edges of both the negative and the prepared plate together and lower it down in contact. The utmost care must be taken not to allow the plate to grate, or the film of emulsion will be injured and cut. The putting in of the back of the printing-frame requires notice. In putting it in always place the side in first nearest where the bars are hinged, thus always keeping it pressed as tightly as possible in that direction; for, if it be not, when the bars are brought down the springs will give it (the back end) a sliding motion and cut and injure the film. The bars having been fastened the frame is now turned over and exposed to light for a length of time depending on the density of the negative, and also on the rapidity of the emulsion and quality of the light. The frame is then taken into the dark room, the back board carefully removed, still keeping it pressed towards where the bars are hinged, when the plate may be removed by a pneumatic holder. While attaching it press on the plate with the thumb and forefinger of the left hand. In my own case I place my left hand on one edge of the plate and lift the plate by one corner with the nail of the fore-finger of my right hand, and by adhering to these rules I seldom damage or injure a plate in the slightest degree.

The development is effected by alkaline pyro. in the usual way, and the proper intensity must be obtained by the alkaline developer alone. The plate is then fixed with hypo. I find it best to add a drop or two of acid to the hypo., as this prevents the film from becoming baggy. The plate is next well washed; not only well washed, but allowed to soak in a tray containing plenty of clean water, as it seems almost impossible to wash out the last traces of hypo. from the film, owing to its being so porous. If not washed properly, after a few days the transparency becomes stained all over in patches, which ruin it completely. About half-an-hour is sufficient time to allow it to soak; it is then well washed under the tap and set up on end to dry spontaneously, and varnished with a pale-coloured, thin spirit varnish.

Having produced the transparency possessing the requisite density—namely, the shadows deep and the high lights transparent, with the intermediate gradations—the next step is to produce the negative. The negative is replaced in the frame by the transparency and another plate placed in contact with it in a similar manner as before when making the transparency, and is developed with alkaline pyro. The intensity must in this instance be also brought up with the alkaline pyro. to avoid any texture, and with ordinary care results can be produced that will satisfy the most fastidious.

Enlargement of Negatives.—The transparency is produced in the same way as already described, only care must be taken not to have the shadows too intense. It is better to make the transparency on a plate somewhat larger than the original negative, for if the plate be the same size the edges of the holder which holds the transparency reflects light, and the edges of the enlarged negative is imperfectly rendered. I use an ordinary room, the window of which is fitted with a shutter in two halves. The bottom half carries the camera, which is fitted to it with focussing arrangement; and about two inches on the further side of the transparency I have a piece of ground glass to diffuse the light. In the upper part of the shutter I have a sliding sash glazed with non-actinic glass, and over that an opaque sliding shutter. In front of the camera I have an upright easel on castors, and on the floor, at right angles with the camera, I have a piece of wood, about 3×2 inches, screwed; and by keeping the side of the foot of the easel close up to it I am always sure of having my subject square. I focus on a piece of glass covered with white paper, the lens open when focussing, and then stopped down. I only require in my practice to work up to 24×18. I do not find the slightest difficulty in coating the plate with emulsion, providing I pour plenty of it on in the first instance; the plate neither requires an edging or substratum of any kind. I always use a washed emulsion, and there is not the slightest fear of the film slipping, for it sticks like wax. When the plate is coated and set, the same as with ordinary collodion, I put it to soak in water (common water), making use for this purpose of a wooden tray lined with sheet zinc, which answers admirably. It is allowed to soak for about ten minutes or a quarter of an hour, or even longer; there is no fear of it spoiling. When the water runs freely over the surface it is taken out, slightly drained, and the exposure made. The plate will keep in good condition for an hour or two. I find about the same time as for wet collodion quite sufficient. When the plate has been exposed, and before applying the developer, it is flushed with water. I find it best to apply the alkali and bromide first. It is immaterial whether ammonia or washing soda is used. After it has been on the plate, and well worked about to ensure even action, a drop or two of a ninety-six-grain alcoholic solution of pyro. is added. If a thin, delicate negative be required use very little pyro.; if an intense negative be necessary use plenty of pyro. I have developed a 24 × 18 plate with only one grain of pyro. By regulating the quantity of pyro. any class of negative can be produced as desired.

I consider enlargements made by the collodio-emulsion far superior to those made by the bath process. I submit for your inspection some prints from negatives produced by this method, and you will find there is not the slightest texture. The foregoing remarks I have made are relative to the way in which I am in the habit of working; others may work in a different way, according to circumstances. WILLIAM BROOKS.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

We all know well enough that photographic prints fade; and, knowing this, some of us have put ourselves to a good deal of trouble to discover and adopt a process the principle of which enables us to say that all doubt as to the possibility of fading is removed. Not so, apparently, does a certain "F.C.S." think; for if we are to believe a statement in a newspaper published within a radius of (let us say) a hundred miles of Liverpool, that "fellow," in announcing his discovery of a new printing process, says that he has "hitherto always adopted the most permanent method known, but the very principle of the present process removes all doubt as to the impossibility of fading." Hitherto photographers have been too much addicted to making assertions as to the durable character of their prints; commend me to the plain out-spoken honesty of the artist who thus claims for his process the absolute certainty of fading. (Do not two negatives equal one positive?) With strange inconsistency, however, he has tacked the former statement on to an announcement that "after many years of experimenting he is now able to publicly state that the photographic basis of all his best paintings is produced by a method which enables him to guarantee its permanency." Now, which of these two assertions am I, as a member of the body public, to accept—that in which permanence is guaranteed, or that in which all doubt as to the *im*possibility of fading is removed? By the way, are only his *best* paintings produced on a permanent basis? If so, on what sort of a basis does he produce his "second best" works of art?

In an excellent letter in The British Journal of Photography, by Mr. James Stothert, on *Horizontal Lines*, that gentleman, after some preliminary reasoning involving no small acquaintance with arithmetic, deduces a conclusion that certainly is in accordance with the editorial teachings of this Journal, and which must approve itself to the common sense of everyone. It is this—that in order to secure a proper balance of lines, and a freedom from abrupt or violent perspective, the point of delineation ought to be as far as possible removed from the subject of delineation, especially when the subject is an architectural one. O, yes! but what about dwarfing the image in such a case, making molehills of the distant mountains, and a mere porter's lodge of my lord's great castle? Mr. Stothert shows that this illustrates the value of long-focus lenses, when practicable, for such views. They compensate, he says, for the apparent loss of size, while preserving the favourable proportion among the lines of the picture secured by the greater distance of the standpoint from the subject. To such doctrines the "Peripatetic Photographer" says "amen" with all his heart.

A good, sound rule, or, at anyrate, an understanding, prevails in the press that no observations should be made upon cases still pending in our law courts; but in the interest of the accused in one such case—a certain artist whose name is far from being unknown to photographers, and who is "in trouble" on account of a charge of bigamy—I must crave permission for a remark. The inspector in charge of the case is reported to have boldly stated to the judge at the Hammersmith Police Court that "he had been informed that the prisoner had married six or seven wives." A bold man, this artist, if such were true; but in the interests of truth I am compelled to say that I have since seen statements in other papers to the effect that he had only three, or at most four, wives living. But even with this reduced number such courage must surely deserve admiration.

Mr. Samuel Fry, who a short time ago was by some persons looked upon as the very apostle of carbon printing, now resolves, after travelling hundreds of miles to obtain data, that he will issue his prints in silver and not in carbon; at the same time he firmly believes that the general use of carbon, when that process of printing is perfected, is but a question of time. It will, perhaps, be in the recollection of most of my readers that it was Mr. Fry who inaugurated the discussion on carbon printing which took place at a meeting of the Photographic Society of Great Britain about sixteen months ago, in the course of which discussion statements were made and specimens exhibited calculated to induce any one to imagine that the photographic millenium had at last arrived. Yet little more than a year elapses ere Mr. Fry speaks patronisingly of it as something that in course of time will come up to the surface when it is "perfected." May not poor carbon well exclaim—*Et tu Brute?*

The term "sal soda" has greatly "exercised" me of late. It is an American term, but as it is sufficiently expressive I see no reason why it should not be acclimatised in this country. From all that I can see it bids fair to be much used, inasmuch as the thing signified is likely to form a component part of the alkaline pyro. developer. The name is far from being all that might be wished, but it is greatly preferable to "washing soda." To designate it as "carbonate of soda" would mislead, as this term is already claimed by the bicarbonate or "baking soda." Then the simple "soda" might also mislead, owing to the bad habit into which photographers have got of using this terse term in connection with the hyposulphite. Many foolish words have been imported into photography, and it may be sometimes expedient to employ terms that do not quite partake of scientific accuracy; hence, if we can swallow "squeegee," there does not appear any strong reason why we should strain at "sal soda." So much for the name; now for the thing itself—of course as an element in the composition of the alkaline developer. I have used it very much of late, and prefer it greatly to carbonate of ammonia, over which it possesses this great advantage—that being stable while in solution a large quantity may be prepared at a time, and it may be left uncorked and uncared-for on the shelf of the laboratory without becoming deteriorated or losing its activity. This cannot be said of the solution of the ammonia salt.

* Concluded from page 208.

THE PRACTICAL WORKING OF THE COLLODIO-BROMIDE EMULSION PROCESS.

[A communication to the Edinburgh Photographic Society.]

I have been asked to give—not certainly a paper on the collodio-bromide emulsion process, but to show my mode of working it. I do so with the greatest reluctance, as the subject has been discussed so often that anything I can say will be just a repetition of what has been said before. It has now been before the photographic world for nearly fourteen years, and during that time has been brought out in many different forms. I refrain from touching on these, as it is sometimes in connection with photographic processes no easy matter to give honour to whom honour is due.

It is now two years since my friend, Mr. Aird, gave me the formula which I at present work. At that time nobody here thought of working anything but Mr. W. H. Davies's beer and albumen process, with which fine work was done; and when I discovered that I had to make the collodion and, what appeared worse, to test the emulsion, I believe I would never have tried to get over it had not Mr. Aird showed me the whole process.

Well, with his assistance, I am just going to do the same thing here; and from the many inquiries which have been made since I showed the work I had done last season, I know that a few more of my amateur friends, when they see the simplicity of making the plates, the beauty of development, and the certainty of results, will give it a trial. A process which has these advantages has certainly a great deal to recommend it, especially when you read a confession like that which appeared in last week's number of The British Journal of Photography, from one of our ablest experimentalists; I refer to Mr. Henry Cooper, who says that with washed emulsions he has, after hundreds of experiments, never been able to depend on plates that have been prepared for more than a few days. Now with this you can keep the plates for a year at all events, and, contrary to the opinion of many, this emulsion will, if properly prepared, keep good for many months. A friend of mine used some that had been kept for a year, and could see no difference in the results from the plates he made and used when the emulsion was new. Now I think this is an advantage that will amply recompense you for the little extra trouble in preparing it.

Professional photographers will, I also hope, be induced to turn their attention to it; for, with a few plates prepared at some time when other business is quiet, they would be ready to do any outdoor work that was wanted—a thing which many of them at present decline to undertake on account of the trouble in taking all the paraphernalia requisite for the usual wet process. I further think the process would be well suited for enlargements. Transparencies, both by contact and in the camera, can be very easily produced by it, and if you have got a good transparency I think any one could with little expense have the means of doing enlargements up to (say) 24 × 18 inches.

I may say I have found these plates no more sensitive in their wet state than when used dry; and lately, when trying them wet, I could not by any possibility keep the film on the plate, but when allowed to dry they would stand any amount of washing.

I will now give you a practical illustration, and will begin with the collodion, a stock of which should be kept on hand, as it improves greatly with age, and it is just as easy to make a large as a small quantity. Our manufacture in the present case, however, will be on a small scale—for the sake of convenience say two ounces. For this quantity I will take four drachms of alchohol. We will now have to weigh our bromides; but, unfortunately, the cadmium salt generally sold is not anhydrous, and we therefore take a small quantity into this small evaporating basin and apply heat, which will soon drive off the moisture. Take twelve grains of this and six grains of bromide of ammonium; mix them together, which seems to make them more easily dissolved. Add this to the alchohol, and then put in twelve grains of pyroxyline, which does not require to be any special kind. This will readily dissolve. Then add twelve drachms of ether, and this is your collodion.

We will now emulsify it; and for the two ounces take twenty-four grains of nitrate of silver, put it into a test tube, dissolve in the smallest quantity of water with the aid of heat, and then add four drachms of alcohol. Boil over a spirit lamp; then add this to (say) one and a-half ounce of your collodion, shake well, and in a few minutes add the other half ounce of collodion. This method of emulsifying seems to give a more sensitive film and finer deposit than if you had added the silver to the full quantity of collodion.

Now for the testing, which frightens so many. Could not some of you give the experiment a better name? I think if it were just said "we will see if the emulsion is right," it would be better. Take a little of it in a measure glass, run it round the glass till a thick film forms, then add a little distilled water; break the film well up, and decant a small quantity into two test tubes. To one add two or three drops of a twenty-grain solution of silver; to the other add the same quantity of bromide of potassium. Should either of them be the least milky there is an excess of the opposite material to that with which it was tested; that is, if the tube be milky to which the silver was added there would be excess of bromide, for which the remedy is to add a little more silver. If the tube to which the bromide was added be milky then you have excess of silver, and require to add a little more collodion. Should the tubes remain clear then you may consider you have your emulsion in its most sensitive state. It should now stand for twenty-four hours at least, during which time you can give the bottle an occasional shaking. Filter through linen, and you are now ready for preparing a batch of plates.

Keep always a supply of clean plates in your box. I prepare mine by soaking them in very dilute sulphuric acid. If they have been varnished put them in a solution of warm water and washing soda, which will soon take the film off; then rinse in cold water, and put them into the acid. When wanted I take them into the washing-house, put the plate on the bottom of a tub, give it a good scrub with a hard brush, rinse with water, drip, and then flow it over with albumen. When dry they are ready for use.

You can now coat the plate with the emulsion. This must be done slowly, as if you tilt the plate suddenly, the same as you might do with wet collodion, there would be a mark made at the top of the plate. Allow it to set well; then plunge it into a dish of water. Take as large a vessel as you can get, and you can then go on coating the plates till your vessel is full; but they should remain in this till greasiness disappears. Take your first coated plate out, drain, and flow over with preservative. Almost any of the usual preservatives will do, but I use bitter beer. It needs no alcohol to moisten the plate before development, and works nice and clean without any restrainer in the developer. You have only to flow it over once or twice, and put it aside to dry.

Like most dry plates these require a backing of some colouring matter to prevent blurring—say a little burnt sienna, to which has been added a little gum to make it adhere, as also a small quantity of alcohol, which allows it to dry quickly as well as helps it to keep.

The plate is now ready for exposure; and although these are, perhaps, not the most sensitive plates you can get, yet my impression is that as you increase the rapidity you also increase the uncertainty. I have two plates with me to develope that were exposed yesterday with Dallmeyer's $8\frac{1}{2} \times 6\frac{1}{2}$ rapid rectilinear, stop $\frac{1}{18}$ focal length, for one and a-quarter minute, and I am quite sure they will be fully exposed.

The development of these plates is, you will see, so simple and beautiful that I do not think any of you will envy those who go in for some of the new processes, where they have almost to work in darkness, and turn up the back of their plates with the expectation of seeing a "ghost." In most cases you only require two solutions in developing—one a saturated solution of carbonate of ammonia, and the other a sixty-grain solution of pyro. in alcohol.

I will now try and develope this plate. First wipe off the backing with a wet sponge; moisten the film with water, or rather wash it till all greasiness disappears. Now take a quantity of the ammonia solution, to which add a few drops from the pyro. bottle; and then flow it with a good sweep over the plate. The image will soon appear, and will rapidly gain in intensity as well as in detail. If the plate be properly exposed it will require nothing further; but should all detail come out without sufficient density, owing to the plate being over-exposed, you had better wash and apply the usual acid pyro. and silver intensifier, not forgetting to swill the plate with weak acetic acid, to neutralise the ammonia that may be left in the plate, before applying the intensifier. You can fix with hypo. or cyanide, but I prefer hypo. ALEXANDER MATHISON.

A PHYSIOLOGICAL HINT TO PHOTOGRAPHERS.

DISCOMFORT, amounting in many persons to actual distress, is experienced in sitting for a photographic portrait. The eye is fixed on a certain spot, and, whilst staring at this, vision becomes indistinct, surrounding objects especially being lost in a thickening mist. A feeling of giddiness, and even of faintness, is apt to follow if the sitting is at all prolonged. Whilst undergoing an ordeal of this kind a few days ago, in Mr. Fradelle's studio, the idea came across me that this strain was unnecessary, and could be avoided by a simple contrivance. Having begged a piece of paper, and drawn upon it a circle of about four inches in diameter, I converted this into a sort of clock face by adding the usual Roman figures in their accustomed places. The paper was then nailed to a post about eight feet distant, and when the sitting began I first fixed my eyes upon the figure XII, then upon I, II, III, and so on, "all round the clock," the gaze shifting leisurely from one figure to another. As I had anticipated, the sitting ended without any sense of strain, mist, or giddiness having been felt; and in place of the eager longing for release usually experienced it seemed to me that I could have sat on without effort.

As Helmholtz clearly puts it, "to *look* at anything means to place the eye in such a position that the image of the object falls on the small region of perfectly clear vision. This we may call *direct* vision, applying the term *indirect* to that exercised with the lateral parts of the retina—indeed, with all except the yellow spot." The mistiness which occurs when the gaze is long fixed in one direction appears to come up from the periphery of the field of vision. This means, probably, that the fatigue of the nervous element is shown first in those portions of the retina which are least highly developed, and where vision is indirect. These parts in the ordinary method of procedure are subjected to a constant strain for a period which frequently amounts to sixty or seventy seconds. By the plan which I adopted, each movement of the eye which brought a new clock figure upon the yellow spot, necessarily shifted also the position of all surrounding objects in relation to the rest of the retina, fresh points of the nervous layer being thus presented to the action of luminous rays every three or four seconds. Hence, fatigue of the nervous element never had time to occur. On the other hand, the rotatory movement of the eyeball in adapting itself, step by step, to the figures upon so small a circle at such a distance was so excessively fine as to cause no interference with the photographic process. Mr. Fradelle, who has since applied the suggestion in many other cases, writes me that "the eyes are excellently well defined, even to the iris; not alone yours, but all the pictures I have taken since have a marked superiority over those I had previously taken in the manner in which the details of the eyes are reproduced. In my opinion, the success of your idea is unqualified. I have questioned my sitters after the operation, and they express themselves as not having had any strain upon their eyes."

It is evident that the plan described is likely, incidentally, to prevent to a great extent the staring expression which the face assumes when the gaze is longed fixed upon an object; for it combines a certain amount of free play of the eyes with accuracy of photographic definition. A somewhat larger circle, I have no doubt, may be employed with even greater advantage; and printed words, pictures, or other objects may replace the figures. For children, and others who do not easily follow directions, a disc with a single aperture towards its edge might be made to revolve in the direction of the hands of a clock before another disc prepared with pictured objects of some kind or other, so that one would appear at a time at short intervals of space and attract the eye. Various other modifications, indeed, at once suggest themselves as feasible, so long always as the figure towards which the gaze is directed presents a *succession* of objects arranged in a circular form.

—*Lancet*. THOMAS BUZZARD, M.D.

ASTRONOMICAL PHOTOGRAPHY.

An interesting course of lectures upon astronomical photography has just been delivered in the Theatre of Gresham College, Basinghall-street, London, by the Rev. E. Ledger, M.A., F.R.A.S., Gresham Professor of Astronomy. The following is the complete syllabus of each lecture of the course.

Lecture I., April 30.—The importance of photography in connection with astronomy. Various photographic processes. The first photograph of the moon taken by the daguerreotype process. The collodion process now chiefly used. Description and practical illustration of the *wet* collodion process. Its special advantages in certain astronomical observations. Explanation of the production of an invisible photographic image by the action of light on molecules. Also of its subsequent development and intensification or building-up. False effects may thus be easily produced in astronomical photographs. *Dry-plate* processes. Their advantages. Illustration of the process used in the recent English transit of Venus expeditions.

Lecture II., May 1.—The nature of light. The actinic or photographic effects of different parts of the spectrum or of differently coloured lights. Importance of such effects in the construction of telescopes for celestial photography. The action of prisms and lenses upon light. Achromatism. Reflecting and refracting telescopes. Necessary difference in refracting telescopes made for eye-observation or for photography. The actinic or photographic focus of an ordinary telescope. Equatorial mountings, heliostats, and other apparatus required. Special arrangements for photographing the moon, the sun, and the spectrum of the solar light respectively,

Lecture III., May 2.—First successes in celestial photography. Records of sun-spots by means of photography and otherwise. Their periodicity. Discussion of their possible causes, and their relation to planetary action, terrestrial magnetism, auroras, meteorology, famines. The recent extraordinary success of Janssen in photographing the sun. Exhibition of some of his results. The probability that the condition of the general surface of the sun as thus shown is of more importance to us than the number or size of the spots upon it.

Lecture IV., May 3.—Photography as applied to the observation of solar eclipses. Exhibition and discussion of the results obtained in 1860 and since. Photographs of the solar prominences. Increasing success in photographing the corona. Exhibition of a photograph of the transit of Venus, and of a Janssen plate of photographs in successive seconds taken by the English expeditions. Discussion of the difficulties involved in such photography. The effects of diffraction, of the atmosphere of Venus, and of the atmosphere of the earth. The coming transit of Mercury. Photographs of the moon taken at Melbourne, and by Rutherfurd and others. Stellar and planetary photography. Recent advances in spectrum photography. Oxygen in the sun.

The lectures were free to the public, and were illustrated by means of the lime-light.

Of the first lecture the *City Press* says:—The lecturer, after a lucid explanation of the importance of photography in astronomical observations, described the various photographic processes which had been found applicable, and showed with a powerful lens on a proper disc the first photograph taken of the moon by the daguerreotype process. He also, by the same means (taking certain observations of the planet Saturn and its ring), exhibited and described the "wet" collodion process. He also explained the advantages of the "dry" process, in which, by means of white of egg and washes of beer, plates could be prepared beforehand and used, without loss of time, in succession, in such a lengthened observation as that by which the transit of Venus was lately recorded. The cleverness of the illustrations and the value of the explanations were testified to by repeated applause.

On Friday last the concluding lecture was delivered to an attentive audience. The illustrations by lime light were numerous and interesting; indeed it was evident that the Rev. Professor had gone into the subject with great energy. He paid a graceful tribute to the men of philosophical position who had made photography so useful, such as Secchi, Janssen, Abney, and others. He exhibited the photographs he had received from Rutherfurd, Draper, &c., of America; from Professor Piazzi Smyth, Astronomer-Royal of Scotland; Professor Airey, Astronomer-Royal of England; and concluded with Mr. Browning's photographs of Mars. The lecturer stated his desire to make the course one of clear exposition of the way the sciences accorded with each other to develope to our minds the connection of the laws of the universe; and, while he acknowledged the attention of his hearers, he hoped his reward would be to have awakened enthusiasm in some of his audience who would appreciate the progress of science. The enthusiastic Professor was rewarded with hearty applause at the conclusion of the lecture.

Our Editorial Table.

A Manual of the Carbon Process. By Dr. Paul E. Liesegang.
London: Sampson Low, Marston and Co.

In this admirable work will be found an immense store of information relating to the important subject of carbon printing. The treatment is such that the work forms an excellent history of the art, an invaluable manual for the carbon student, and a useful work of reference for the advanced printer.

Its appearance in an English form is owing to the fact of the translator, Mr. R. B. Marston, having had some of his negatives printed in carbon, he was so much struck with their beauty that, when afterwards meeting with a copy of Dr. Liesegang's *Der Kohle-Druck*, then in its fifth edition, he formed the determination of translating and publishing it in England. This, from his connection with the eminent firm by whom the work is published, Mr. Marston was easily enabled to do. The work is "got up" in an admirable form, is well printed on toned paper, and contains numerous useful illustrations.

Having completed the historical portion of the work, Dr. Liesegang describes in what manner work-rooms should be fitted up, passes on to the various preparations required in carbon printing, devotes a chapter to the making of carbon tissue in various colours, describes in what manner single and double transfer papers are prepared, and, after remarks upon the best methods of reversing, multiplying, and detaching negatives, enters upon the details of printing in its various ramifications. In this department of the work such subjects as photometers and printing and tinting-frames receive due consideration. Transparencies next claim the attention of the author; and having treated on enlargements, he closes with a useful chapter on *Failures and Remedies.*

In the above manner have we epitomised the contents of a work containing upwards of a hundred and forty pages. The author endorses the opinions we expressed some years ago when we spoke of the value of white "alba plates," or enamel tablets, as a base upon which to develope carbon pictures. Here is what he says respecting this:—

"Instead of on to transfer paper, the carbon print adhering to the flexible support may be transferred to any other surface which has been coated with gelatine.

"A fine carbon print on an alba plate has an extremely charming appearance. These plates are ferrotype plates coated with a delicate white lustreless enamel. They can be coated with collodion like glass and a carbon print developed thereon, only the picture will then be reversed. To obtain a correct picture the print must be developed on the flexible support and, after drying, transferred to the enamel plate, which must in this case have been previously coated with gelatine. The gelatine should be used in a two-per-cent. solution, and just before use a little chrome alum* solution added whilst the mixture is stirred. It should be put, while still warm, on the enamel with a broad brush, and allowed to dry. The flexible support with the adhering tissue and the gelatinised enamel plate are placed in cold water, and, under water, the two prepared surfaces are brought together. Both are then taken out and allowed to dry; the flexible support can then be taken off and leaves the print on the enamel.

"In the same way any carbon print can be transferred *from the flexible support* to canvas, opal glass, porcelain, and other surfaces, provided they are previously coated with the gelatine solution."

On the subject of toning and intensifying carbon prints Dr. Liesegang says:—

"A carbon print on clean (plain) or collodionised glass can be intensified in various ways; in proportion to its thickness the damp gelatine will absorb both fluid colouring matters as well as solutions, which by double decomposition yield coloured deposits.

"The object of the colouring may be both to give the print another tone and strengthen or make it more vigorous.

"A solution of permanganate of potash poured on to the damp carbon print changes its colour to olive green. This shade, though unpleasant to the eye, is yet of great value in multiplying negatives, as it imparts photographic, though not visible, vigour to the print.

"A fine purple is obtained by employing solutions of purpurine or of artificial alizarine diluted with water. Many aniline colours yield extremely pretty shades; but the want of permanency renders their employment unadvisable, especially in prints which are much exposed to light.

"Laurent recommends dipping the picture into an old iron solution (developer), and, after washing, pouring gallic acid over it. This plan has been improved upon by Monckhoven, who steeps the print for five minutes in a solution of four parts of persulphate of iron (not to be confounded with the usual protosulphate of iron) in 100 parts of water, rinses for an instant in cold water, then steeps it for ten minutes in a two-per-cent. solution of carbonate of soda, again rinses in water, then places it in a one-per-cent. gallic acid solution until it assumes the desired dark violet tone. The print is then washed and dried.

"Pictures on glass to be intensified in this way should not be printed too dark.

"A very beautiful blue-black colour is obtained as follows:—Logwood extract is dissolved in warm water and allowed to get cold. This solution is poured on to the damp print; after a short time it is rinsed with water and a solution of bichromate of potassium poured on. This treatment may be repeated several times, but not *too* often, or a deposit will form on the gelatine film. Prints so treated gain in vigour wonderfully.

"As before mentioned, the damp picture can also be intensified with pyrogallic acid and silver, like a collodion negative." †

* Three hundred grains of gelatine in twelve ounces of water, to which is added a solution of fifteen grains of chrome alum in half-an-ounce of water,

† Herr von Stefanowski has described a large number of different methods of intensifying carbon prints.

From the brief extracts given may be formed some idea of the value of this very practical manual of carbon printing, which is published at a very opportune period.

Hints on Reflecting and Refracting Telescopes.
By W. H. Thornthwaite, F.R.A.S.
London: Horne and Thornthwaite.

It is somewhat difficult to imagine the existence of a telescope unrepresented in this treatise, which bristles throughout its hundred pages with useful information in connection with reflecting and refracting telescopes of every kind and equatorial stands, accompanied by explanatory diagrams. It forms the most pleasant and not the least profitable reading on the subject of telescopes that we have ever met with, besides being highly suggestive. The work embraces various formulæ for silvering glass mirrors, for we need scarcely observe that silvered glass mirrors have now superseded the time-honoured metallic specula in reflecting telescopes. It also contains, in tabulated form, a list of those stars that are used as tests for separation, definition, and illumination, together with numerous hints on the treatment of telescopes. The present edition is the third, and it has been much enlarged and improved.

The "Bennett" and "Swan" Dry Plates.

When the gelatine process was commercially introduced a few years ago we well remember Mr. Kennett complaining, with no small degree of bitterness, that he could not induce photographers to expose their plates for a sufficiently brief time. In every instance, he said, in which a failure occurred it arose from over-exposure. He met this "sin of unbelief" by introducing plates which would bear a protracted exposure—an exposure equal to, if not exceeding, that required for wet collodion. Even this, it must be admitted, is very rapid for *dry* plates, which have hitherto been associated with the idea of very prolonged exposures.

When in our issue for March 22 (page 134) we noticed certain pictures that had been exhibited at the South London Photographic Society by Mr. Bennett, who subsequently presented to the readers of this Journal the details of his *modus operandi*, a revolutionary step seemed to have been taken; for pictures on dry plates of interiors by gaslight, and of river scenes taken by the action of a drop shutter, transcended the popular idea of the capabilities of dry plates. Following close upon this we have the announcements—made in connection with the commercial aspect of photography—that the Liverpool Dry Plate Company on the one hand, and Messrs. Mawson and Swan on the other, are issuing dry plates of exquisite sensitiveness, and it is our privilege at the present time to speak of trials made with the dry plates of these firms which have been sent to us for "review."

Mr. Mawdsley's plates, we are informed, are prepared on the basis of the directions given by Mr. Bennett in an article in our number for March 29th. These plates, it is said, "will prove invaluable to professional portrait photographers, who are many times called upon to take the portraits of nervous or paralytic persons, or of fractious children, in the photographing of whom the ordinary wet collodion, sensitive though it be, proves too slow." This certainly is a very strong statement, and indicates in unmistakable terms a decided advance upon the rapidity of wet collodion.

"Swan's plates" (manufactured and sold by Messrs. Mawson and Swan) are also introduced to us in very strong terms of commendation. In brilliant noonday light, we are told, and using a quick-acting lens, views of the sea with shipping, and street views with moving figures, may be secured; a fraction of a second will suffice for the duration of the exposure in the camera.

We have tried, very carefully, both the "Bennett plates" and "Swan's plates." We have given to both of them exposures which have been *exceedingly* rapid, and in both cases we obtained most excellent negatives. The "Bennett plates" have a glassy surface; in "Swan's plates" the surface partakes of a slightly mat appearance. When using some excellent ferrous-oxalate developer sent by Messrs. Mawson and Swan with the "Swan's plates" we found that the image appeared very soon after it was applied, and that this image, which was on the surface, took some little time to reach the back of the film. To ensure the perfect development of a picture Messrs. Mawson and Swan recommend that a bath be employed, and that an immersion of from five to fifteen minutes be given. The "Bennett plates," owing to a difference in the permeability of the film, are acted on throughout the thickness of the pellicle with great rapidity. Our experiments with these plates have not been quite so complete and exhaustive as we should have liked them to be, owing to the inclemency of the weather at the time we had set apart for trying them on landscape subjects; but we have seen enough to enable us to speak with certainty concerning their merits, and by the time we have used up the samples with which we have been furnished we shall be enabled to speak more positively with respect to them.

In using such sensitive plates it is of the utmost importance that the light in the dark room be very much subdued; if professional wet-plate portrait photographers fail with them it will be owing to the amount of light usually present in their dark rooms. We shall return to this subject.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 14	Photographic Society of Great Britain	5a, Pall Mall East.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held on the 2nd inst.,—the Rev. F. F. Statham, President, in the chair.

After the transaction of private business Mr. William Brooks read a paper on the *Reproduction and Enlargement of Negatives by the Collodio-Emulsion Process.* [See page 219.] During the reading of the paper specimens were handed round for examination.

The Chairman thought that they could not have better or more perfect specimens than those exhibited, and thanked Mr. Brooks for his paper.

Mr. Bridge had worked very successfully by artificial light in the way suggested by Mr. Brooks.

Mr. Foxlee up to the present time had imagined that nothing could equal carbon as a process by which to obtain a good enlargement, but it was evident that the emulsion process was quite as good. He inquired by what process—whether by wet collodion or emulsion—the negatives were obtained from which were produced the enlargements then exhibited.

Mr. Brooks said they were by the wet collodion process; but if he were taking negatives with the view to their being enlarged he would certainly employ an emulsion process. Mr. Foxlee, he was aware, had by the wet collodion process obtained negatives in which the deposit was a mere stain.

Mr. Foxlee said that in doing so he had employed a purely iodised collodion and pyrogallic acid development, the resulting pictures being composed of silver in a state of division so minute that Mr. J. T. Taylor had pronounced it to be a stain.

Mr. J. T. Taylor considered that the term "stain" was applicable to Mr. Foxlee's negatives only when examined by a low power under the microscope. But when a high power was employed the atoms composing the image were plainly visible, hence the term "stain" was inadmissible either in this or in the albumen process, in which the atoms were equally diminutive.

Mr. W. M. Ayres spoke of the great advantage of using only a very small quantity of pyrogallic acid when developing emulsion plates.

Mr. F. Wratten confirmed this statement. A weak solution of pyrogallic acid possessed great power in developing a feebly-impressed image.

Mr. Brooks advocated the system of duplicating negatives before sending them to be printed from. There was no trouble in taking a transparency, from which negatives could be made whenever required. He much liked the use of moist emulsion plates. They were treated, after collodionising, with a mixture of one part of glycerine and five parts of water. He used cheap glycerine at tenpence per pound.

Mr. Harrison exhibited a simple yet effective double dark slide for the camera; after which the proceedings terminated.

EDINBURGH PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held in 5, St. Andrew-square, on the evening of Wednesday. the first instant,—Mr. Muir in the chair.

The following gentlemen were unanimously elected members of the Society:—Messrs. W. Gibson, C. N. Byrne, John Anderson, Alex. Craig Christie, Alex. Mitchell, Robert Wallace, James S. Sutherland, John Masterton, John Ancrum, H. S. Pillans, Wm. Jenkinson, P. Canning, J. R. Cooper, J. T. Gerard, — Ross, and Henry White.

The whole evening was devoted to an interesting demonstrative lecture by Mr. Alex. Mathison, who entered fully into the most minute details of the collodio-bromide emulsion process as practised by himself, illustrating practically the manufacture of the plain collodion, the salting and sensitising of it, the testing of it when made, and so on in all its stages to the final development and finishing of the negative. From the great interest manifested and the eager attention with which every detail was followed by the large number of amateurs present, it may be anticipated that this process will receive even more attention than it has hitherto done, although for some time past it has been the established favourite of the Society. For Mr. Mathison's paper see page 220.

Mr. T. Pringle said that all present must have been greatly benefited by the most explicit demonstration just witnessed. He had always found Mr. Mathison very anxious to give all the information in his power, and on one occasion he (Mr. Mathison) had supplied him with a batch of plates. He had found them so very simple to manipulate, and so certain in results, that he was quite enamoured with the process. While allowing that it might not be the most rapid process known, he thought there was not one process that was so certain to produce perfect results by such simple means and with such little trouble.

Mr. M. G. Dobbie considered the Society was under a deep sense of gratitude to Mr. Mathison for the very graphic manner in which he had experimentally illustrated all the minutiæ of the process. It was another valuable communication of an intensely practical nature, enabling those present to carry away with them something tangible, to be utilised in the future daily experience of all interested in their fascinating art-science.

Mr. Aird acknowledged the kindness with which Mr. Mathison had so courteously associated his name with the process, but he considered that gentleman was too modest in his estimation of the part he himself had played in advancing the merits of the process so persistently, as it was greatly due to his (Mr. Mathison's) personal exertions that the Edinburgh Photographic Society had so largely adopted it. He, however, thought that Mr. Mathison had scarcely done justice to its capabilities when he described it as "slow." He believed it was not only the most reliable process known, but he had practically proved it more sensitive than some of the most celebrated gelatine processes; and he considered that if the exposure of the plates developed before the Society had been very greatly reduced, equally good negatives would have resulted by somewhat prolonging the action of the developer.

Mr. W. T. Bashford (Corresponding Secretary) congratulated Mr. Mathison on his very successful demonstrations. He had often before borne testimony to the remarkable simplicity of the operations and the beauty of the results. He was glad to find that the process was at last taking the position it deserved. A gentleman at a distance, knowing the great interest the Society had taken in the emulsion processes, had forwarded a very fine twenty-four-inch enlarged negative, which he submitted to the criticism of the Society, and bore testimony, similar to the large negatives exhibited by Mr. Mathison, that very large plates could be coated by collodio-emulsion without any defect whatever. The emulsion used in that particular instance was Mr. Brooks's emulsion, and possessed the very remarkable property of needing no substratum or edging. His correspondent wrote as follows with regard to enlarged negatives by wet emulsion:—

"The transparency is made by contact on an emulsion plate (dry) in an ordinary printing-frame, and developed with alkaline pyro. (carbonate of ammonia being the alkali used). The enlarged negative is made with ordinary apparatus. I used a room with the camera and focussing arrangement fitted to a shutter that is fitted to the window. An upright easel on castors runs the whole length of the room. This system has been described many times, and needs no further comment. The glass plate neither requires a substratum or edging with india-rubber, and there is no fear of the film slipping, as it sticks to the glass like wax. The plate is coated with collodio-bromide emulsion, and as soon as set it is placed in a large dish or tray of water. I use a wooden tank lined with zinc. The plate is allowed to remain for about a quarter of an hour; it is then moved about, and when all greasiness has disappeared it is taken out, drained, placed on the easel, and the exposure made. An emulsion used in this way requires only a short exposure. It is then developed with alkaline pyro. (carbonate of ammonia and common washing soda being used), and then fixed with hypo."

Mr. J. R. Crighton exhibited four very choice views taken at the recent outdoor meeting held at Rosyth Castle, the property of the Earl of Rosebery. This was the first of the season. The pictures were greatly admired for their composition and feeling, and it was remarked that in general effect they had more of the picturesque than is ordinarily obtainable.

With the usual votes of thanks the proceedings were concluded.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Society was held at the Museum, Queen's Road, Bristol, on Wednesday, the 1st inst.,—Colonel Biggs in the chair.

The minutes having been read and confirmed the Rev. C. Harg, of near Frome, was elected an ordinary member, and Mr. L. Miles, of Cardiff, a corresponding member of the Society.

Colonel Biggs then read a paper entitled *On the Calotype Process* [see page 218], which explained in a most clear and practical manner the whole formulæ and details of the process, and which was a most interesting communication. The enjoyment of the paper was also greatly heightened by the presence of a large number of exquisite productions of Colonel Biggs, taken while in India, the majority of the pictures being of large size. It was remarked by many that it seemed a great pity that a process yielding such beautifully-harmonious pictures should have fallen almost entirely into disuse.

Mr. Holt suggested an attempt at finding some suitable flexible substance, instead of glass, between which to expose the sensitive paper, as then it might be used with a roller dark slide.

Colonel Biggs feared that could not be effected, as the paper must be kept damp, therefore considerable compression was required.

Mr. H. A. H. Daniel remarked upon the great delicacy of detail and beautiful atmospheric effect obtained in the negatives placed before the meeting, and said that everyone must have noticed the great absence of granularity in the appearance of the pictures. He considered that for large work the results could be considered very little, if at all, inferior to those of glass negatives.

Colonel Biggs pointed out the great advantage of the extreme lightness of the sensitised surfaces as compared with a box of (say) 15 × 12 dry plates.

Mr. E. Brightman said that since he had seen one or two of the very fine results exhibited by Colonel Biggs at a previous meeting he had many times felt very anxious to make a trial of the process which Colonel Biggs's valuable paper had now rendered not only possible but most clear.

A vote of thanks was accorded to Colonel Biggs for his most interesting and instructive paper.

The Secretary then reminded the members that was the last indoor meeting of the session, and that after a Council meeting had been held the first outdoor meeting would probably take place in the first week of June.

Correspondence.

THE FRENCH EXHIBITION.—MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.

On the 28th ult. I paid a visit to the *Exposition Universelle* in the palace of the Champs de Mars, and in the British section there were no photographic prints visible—the screens to which they were to be suspended not being then finished; in fact, French workmen were engaged nailing on rough canvas and papering. This last is of a warmish, flat colour to relieve the tone of the proofs. The screens—fourteen in number, and open at the bottom—are about seven and a-half feet high and about nine feet long, surmounted by a black moulding. They are movable, being supported upon scrolled feet, both sides of the screens being available as hanging surfaces, and therefore balancing each other. They will occupy the floor space between the court of the noble display of drawings for the *Graphic* and the upright window forming part of the Street of the Foreign Nations. The screens are to be placed at right angles thereto, and therefore having, like a portrait studio, a very high northern side light very suitable for the uniform lighting of the photographic specimens which will be exposed for our admiration.

The old saying that "one volunteer is worth a dozen pressed men" will again be verified, for a distinguished photographer having offered his services to hang the pictures sent in by British photographers, and which having been accepted by Mr. Cunliffe Owen, I am sure that what man can do in the very limited time left, whether his tastes be of the school of Young England or of Old England, will be ably and efficiently done to the best of his talent. I think I have sufficiently named Mr. William England, who will be aided by his *confrères*, Messrs. Payne Jennings, Warnerke, and other English exhibitors.

During the same visit, and likewise on a previous occasion, I had the pleasure to see completed with its noble contents the exhibition of Mr. J. H. Dallmeyer, and which, amidst the astonishing chaos around it, is seen to great advantage. For the early completion of this show-case great credit is due to the exhibitor's son, Mr. Andrew Dallmeyer, whose activity under trying circumstances is very praiseworthy, and who was well seconded by one of the *chefs d'atelier*, Mr. Ford. The automatic equatorial appears to be of marvellous construction, having the seal which also stamps the production of this celebrated optician, including his photographic lenses, telescopes, microscopes, view searcher, &c. I also remarked the show-case of Mr. Dolland, with its thermometers, field glasses, levels, burners, &c., but which were, like a lady's hair on the eve of some grand display, still in paper.

Mr. T. J. Middleton has a well-got-up triple lantern, designed by Malden, consisting of French polished mahogany body and brass fittings. The back of the show-case being a large mirror enables the visitor to see the back of the lantern, with its electric gas tubing and stopcocks, without changing his position. It is accompanied by numerous examples of lantern slides.

The colony of Victoria has already arranged a large collection of photographs of her public buildings, country houses, and scenery. There are views in Melbourne equal in artistic merit to anything in the old country. I was pleased with a photograph of Sargood, Son and Co.'s stores, Melbourne, which possesses a fine Italian palatial front of great architectural beauty. This picture, and also that of the classical elevation of the Mint and the town residence of Dr. Beanay, are by Mr. C. Nettleton, photgrapher, and are worthy of praise. The city of Sandhurst and the borough of St. Kilda have sent frames of interesting prints, among which are the great Yen Year reservoir and the residence of Mr. Twentyman, which display great taste. There is a frame from the borough of Echuca connected with the united shire of Metcalfe, the shire of Colac, and other subjects. This Victoria collection occupies a wall space of about twenty-four yards long, and was the first I saw completed, which is highly creditable to the representative of a country one of the farthest from the place of exhibition.

Sydney, New South Wales, is largely illustrated. Owing to its great size the eye is at once attracted to the panoramic view of Sydney harbour and suburbs, photographed by Mr. Charles Baylis. The work is about eleven yards long and in twenty-three pieces. This print, which is attached to a flat wall, would have had its importance and value increased had it been exposed upon a circular surface like a diorama, which would admit at the same time of arrangements to increase the appearance of reality. The work of the photographer is meritorious, but he should have reduced the darker parts of the margins of the several pieces to conform with the tone of the central parts. There is a copy from a negative five feet by three feet two inches in one piece—a view taken from the same residence and by the same photographer—which in its immensity and excellence I have not seen surpassed in Europe, and here the defects I have alluded to in the panorama do not appear. Mr. Greenfield's name is on several frames of enlarged portraits, and Mr. Hubert Newman, photographer, of Sydney, exposes some really excellent large portraits direct from life, and which display fine artistic qualities, the sizes being about 20 × 15 inches.

In the section of the United States the only display of photographic prints I saw during my recent visit was some that were utilised above the cornice, and forming part of the glass show-case of Mr. Mohr, of Philadelphia, which contained their manufactures, and the photographs showed the different *employés* of the establishment in which their goods were manufactured. The idea is excellent.

In the Spanish department I only saw the photographs of Ortega, Otera, and the good work of Alviach.

In the Hungarian section were already placed the show of Kozic, of Pressburgh, and Zansboni, of Fiume.

The Austrian photographic display is in an outer building, and is under the able direction of Dr. Hornig, who, I find, has been promoted to the rank of Colonel.

In the Russian department will be found the name of Count Lewitsky, whose name is highly esteemed in France, and who will represent his country here as juror—the same office he so well filled at Vienna, where he gained universal approbation by his knowledge and great courtesy to his colleagues. M. Lewitsky first introduced negative pencil retouching in Paris, having learnt it, when he was an able and rich amateur and Grand Seigneur, from a young English lady who practised photography professionally at Naples, and whose talent was so highly appreciated that an appointment for a sitting could not be secured under three weeks. This lady's name, if I recollect rightly, was Young, but she was best known under a French translation as Mademoiselle Lejeune.

In the French portion of the photographic display very little progress has been made, owing, in a great measure, to the delay of the administration in the construction of a staircase up to the top of the roof for repairing and cleaning purposes, and which prevented the court being finished, and at the same time occasioned great quantities of dust.

I again made a tour of the palace on the 30th of April, the day and evening before the opening day, and found my expectations as to the English section gratified, for Mr. England and his associates had in two days made considerable progress, and it was my privilege to see, among other contributions, those of Mr. William Bedford, who makes a goodly show. Amongst the exhibits of the London Stereoscopic Company are portraits of the Beaconsfield Cabinet. Mr. A. L. Henderson exhibits enamels; M. Bardoux, of Jersey, shows chromotypes; Mr. Carl Norman agricultural specimens; and Mr. Faulkner a large collection of portraits of children and fine enlargements. The Autotype Company contribute collotypes and an enlargement of the Princess of Wales. Mr. Samuel Fry shows three *genre* pictures, and Mr. England a collection of views and sculpture. At the time of my visit the pictures of Mr. Payne Jennings and some others had not been hung. Mr. Slingsby exhibits his picture entitled *Alone*, which appears to me to greater advantage lighted up as it now is from the north than it did when shown in the London Photographic Society's top-lighted gallery in Pall Mall. Mr. Slingsby also exhibits two portraits.

Mr. Robinson has contributed his two well-known pictures, *When the Day's Work is Done* and *Preparing Spring Flowers for Market*. Last, though not least, in the show Messrs. Elliott and Fry exhibit several large and effective heads and busts, relieved by colour, and also a full-length, naked sleeping child, on seeing which some of my American cousins exclaimed—"What a sweet little darling!"—"What a shame it should be naked!"—"Pray cover it up!" whilst one kind soul tried to catch with her hand a fly resting and sucking the left arm, and on finding out how she had been tricked by the artist said—"Well, really, it is too wicked of the painter to attempt to play upon our feelings by representing the sweet love of a child likely to be disturbed by such a blood-sucking monster!"

Altogether, if the English contributors do not startle the Parisians by the large number of works exhibited, they will, at all events, do so by the quality of their exhibits.

In the French Court the dirt has been got rid of and progress made. A splendidly rich collection of frames and portraits in various sizes by M. Frank de Villecholles is displayed. M. Pierre Petit contributes portraits, some on porcelain in blue, sepia, and purple, which I was told by one of the committee were burnt in the fire, but which I imagine are not vitrified pictures at all, being probably in carbon and warm dried varnish; in fact, some of the portraits have the lightest half-tones washed away, as is well known by carbon workers when the development is commenced with too hot water.

I recommend English visitors to examine the richly-bound and gilt-edged portfolios of MM. Provost, Pere and Fils, of Toulouse, containing some fine pellicular films, which are very thin but perfectly flat. They smell of caoutchouc, and are accompanied by a positive placed in juxtaposition. They are only attached by a slip at the upper edge, and so rest suspended while the pages of the portfolio are turned over and examined. The negatives are pure and without spots, stains, or other defects. M. Manoury, of Angers, comes out strongly. MM. L. Loup Fils, of Rodez, has some very creditable and clean photolithographs from negatives after nature. M. Ernest Ravet, notary, shows diatoms and other microphotographs of great excellence. The exhibits of M. Baldus, helio-engraver, do not show much advance; and the same may be said of the productions of M. Henri Garnier, the inventor of the method of coating engraved copper plates with iron. The proofs of M. Jeanrenaud (from negatives on bromide of silver, partly emulsions and partly bath plates) are in carbon prepared by himself. Two of his prints are perfect pictures. He has a partiality for sepia or black tones like engravings. M. Walery exhibits silver and carbon prints—*cartes*, cabinets, whole size, and enlargements; also enamels of great dimensions executed in his own studio. His carved frames and fittings up cost over £300. M. Gumet exhibits some most excellent views in silver with a sepia tone. M. Vidal has a goodly show of his varied works, in printing ink, Woodburytype, and photochromy, which, I need not say, are unrivalled. M. Vidal is entitled to great praise for the progress he has made, and his present work may be regarded as only the *avant courier* of what he will yet do. M. Liebert makes a good display, and his frames are most luxurious—in no way behind his competitors for public favour. A special feature is his carbon printing. Every day will now largely add to the attractions of the photographic court.

I must return on a future occasion to the admirable photographs displayed in the Canada section, where some of Mr. Notman's frames were only brought out for the inspection of the Prince of Wales during the general review he made before the opening, and which were then closed in consequence of the dust.

May 1, 1878.—It would be out of place in this Journal to say more than this grand day for France is past, and all her friends who, like myself, remained upon her soil and laboured hard for her during her days of misfortune and suffering may well rejoice at the grandiose aspect of the *Exposition Universelle* opened with such ceremony, and in the presence of such an illustrious company, scarcely a few years after her days of disaster and grief. It was truly a solemn moment, and the patriotic emotion of the spectators can well be appreciated and acknowledged by one of her old and steadfast friends.

At the same time my native loyalty was not extinct, for I became for the moment fugleman and gave the measure of time with my "hip, hip, hurrah!" as the old Marshal came gingerly along upright, slightly like a dashing young cavalry officer, picking his way along the newly-made roads freshly gravelled, which from the almost unprecedented fall of a thunder shower a short time before was like a sponge and retained, in chemical phraseology, an unknown quantity of water, until he reached the terrace in front of the Palace of the Champ de Mars, having on his left the Prince of Wales. The ringing cheers produced by the measure I adopted quite took by surprise my French friends around me, and they actually, in the heat of the moment, neglected to give (except in the case of one solitary patriot) the counter cry of "*Vive la Republic!*"

I noticed a French photographer at work on the balcony over the central entrance, giving numerous but long exposures of from five to ten seconds with a large single lens of patristic shape—that is, of French manufacture—and which would embrace the lines of soldiers, the park, the bridge, the fountains on the slope of the hill side crowned with the palace of the Trocadero and its hemicycle of galleries, arcades, and columns—a view and decoration truly French in character and unequalled in the world,

I looked around for Messrs. England, Payne Jennings, and York, and their *instantaneous* exposures of the ceremony, having understood they had made applications for the necessary official permission to photograph generally the Exhibition.

The whole world now photographs, and from every clime are contributions which I must examine and see if national peculiarities have any bearing upon our art; for even Japan uses photography to illustrate her works, and I saw prints of the silk-weaving establishment of Oshmia Shosha, showing an excess of most minute details. I had almost written that you could count the blades of grass in the foregrounds, and this quaintlike minuteness is to be found in many of the Japanese productions.

At the last monthly meeting of the Photographic Society of France there was a very poor programme, consisting mostly of presentations of examples of proofs in printing ink and of M. Vidal's new publication—*General History of Tapestry*—a work admirably adapted to display the marvels of photochromie. The Honorary President (M. Peligot) and the Honorary Secretary were unavoidably prevented from attending,

I had the honour, as representative of The British Journal of Photography, to introduce to M. Davanne, who so well occupied the chair, three English gentlemen whom I had invited to be present.

First there was Mr. William England, whose labours, M. Davanne said, for many years in several quarters of the world, in heat and in cold, had brought him universal renown. Secondly, to Mr. Payne Jennings, M. Davanne said, on regarding an album of his landscapes, that in offering to him his compliments he must add that France, after a display of such great beauty, had still to learn how to produce landscapes. Thirdly, to Mr. Warnerke he (M. Davanne) remarked that his reputation as an emulsion worker commanded his respect. To the three gentlemen the Chairman gave a warm welcome, and said the Society was honoured by their presence on that occasion. The reception by the members of Mr. Payne Jennings' proofs was the event of the evening.

I must, from the length of this communication, reserve further remarks until next week, simply adding that I shall forward to the Editors one of M. Michaud's photo-engravings, presented by him to the Society. Mr. Warnerke had the kindness to make an interesting experiment on blurring; but he wishes the details to be reserved until he can present them, together with a paper, to the Photographic Society of Great Britain on his return to England.

Asnières (Seine), Paris. W. Harrison.

THE FERROUS OXALATE DEVELOPER.

To the Editors.

Gentlemen,—I have two slight remarks to make about the using of ferrous oxalate developer:—

1. Opalescent streaks sometimes occur when this developer is used. These are probably due to the formation of oxalate of lime in conjunction with the use of water containing lime for washing the plates subsequent to development. These streaks (which, however, are not very detrimental to the printing qualities of the negative) will be avoided if rain or distilled water be used for washing the plates instead of tap water.

2. I find that ferrous oxalate solution advantageously replaces the nitrate of silver, Schlippe's salt, or other of the chemicals now commonly used for blackening the image after treatment with bromide of copper. —I am, yours, &c., Joseph W. Swan.

11 *and* 15, *Mosley-street, Newcastle-on-Tyne, May* 3, 1878.

BRISTOL AND WEST OF ENGLAND INTERNATIONAL PHOTOGRAPHIC EXHIBITION.

To the Editors.

Gentlemen,—As the intention to hold this exhibition at the end of this year has got considerably abroad, I write to you just to state that, looking at the unsettled state of things at home and abroad, it has been decided to postpone the exhibition till December, 1879, all things being then favourable.—I am, yours &c., H. A. H. Daniel, *Hon. Sec.*

Bristol, May 7, 1878.

EXCHANGE COLUMN.

A Voigtlander rapid B *carte* lens, also 1B long Dallmeyer with rackwork camera for two *cartes.* Wanted, in exchange, No. 3 and 4 Steinheil or 6 × 5 and 8½ × 6½ rapid rectilinear.—Address, R. H. D., care of Mr. Starkey, 2, Lower Notting Hill-terrace, W.

Wanted to exchange, a 10 × 8 rapid rectilinear lens, 13 inches focus, with stops (quite new), for a No. 5 wide-angle landscape lens, 15 inches focus, or a No. 3 wide-angle rectilinear, 13 inches focus—all of Dallmeyer. Difference in money to be adjusted.—Address, W. Harding Warner, Duffield, near Derby.

ANSWERS TO CORRESPONDENTS.

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

Albert E. Fradelle.—Thanks.

W. L. R.—1. Several months.—2. We have now discontinued (at least for a time) the use of carbonate of ammonia.

Photographer (Oxford).—Mr. M. Carey Lea's *Manual* is probably the best book on the special phase you mention.

W. H. Wells.—A solution of Canadian balsam is much employed for this purpose. Let it be dissolved in spirits of turpentine.

S. A. S.—Write to the various makers of and dealers in lenses and obtain their catalogues, and then devote an hour to studying the prices. You will in this manner be enabled to decide as to the probable advantages of buying a new or second-hand article.

T. B.—There is nothing specially the matter with the negative. Had it been a little longer exposed it would print softer; but even as it is it will produce a good print. Of course the paper must be sensitised so as to suit the negative. Let it be printed in a weak light, not in the sun.

H. W.—So long as the air-bubble is allowed to remain in the cement of the lens it will be quite impossible to obtain good definition on one particular portion of the picture when using the lens with its smallest diaphragm. It will be much better for you to have the lens re-balsamed, by which operation it will be restored to its pristine excellence. In reply to your second question: we are not in a position to offer any opinion, the data for forming such being insufficient.

R. H. D.—1. Grind the glass with flour emery and water, making use of a small, flat piece of glass for the purpose.—2. Clean the brass and apply a solution of chloride of platinum.

Geo. Adams.—Make some glazier's putty, but instead of employing whiting in doing so make use of brown ochre. When this putty has become tolerably hard make it into a roller and move it all over the glass of your window, by which a uniform brown colour will be imparted, coupled with that agreeable matt peculiar to such an application of putty.

C. O. O. S.—It is somewhat surprising to learn that anyone who has given the process of photolithography a fair trial has failed to succeed with it, because, like the wet collodion process, anyone who bestows a little care and attention upon it is certain to succeed. To give you the few hints craved for in this column would be quite out of the question; it is for you to give us a detailed description of your manner of proceeding, by which we shall readily discover the special point where you fail.

G. H. R. (Leeds).—Pour the whole of the albumen on a plate of tin, taking care that it does not run over the edges. The tin plate must, of course, be placed quite level. Now arrange for a current of air to pass over the surface so as to dry the albumen rapidly. Heat must on no account be applied, or the albumen will be coagulated, not desiccated. When quite dry it may be removed from the tin plate and broken up in small pieces, in which state it will remain good for many years if kept in a bottle.

J. B. R.—For a lens that has a long focus a swing back is almost indespensable in taking a landscape; for without this adjunct it will be difficult, if not impossible, to get the grass, flowers, and objects in the immediate foreground as sharp as is desirable. Owing to the law of "conjugate foci" the particular portion of the lens by which the objects in the *foreground* are delineated is of longer posterior focus than the part by which distant objects in the same picture are formed; hence the importance of being able to swing the upper part of the ground glass farther away from the lens.

Medicus.—Seeing that the distance between the visual and chemical focus of a lens increases in proportion as the object upon which it is focussed is approached to the camera, it is quite impossible to adopt, with any degree of success, the plan you propose for the purpose of effecting the focussing. Much better is the system, which has been frequently recommended before now, of having a simple convex or concave lens (a spectacle lens will answer) interposed—*à la* Waterhouse diaphragms—between the lenses, the focus of this lens being equal to the difference of the two foci. After focussing with such a glass the dark slide is inserted, the supplementary testing lens is removed, and the picture is taken.

Geo. Wilson.—Our correspondent, in writing to thank us for publishing the new patents relating to photography in the systematised manner that we adopt, is of the opinion that it would still further conduce to the interest attached to photographic patents if we would periodically publish a list of the lapsed patents—those on the one hand which have lapsed at the termination of the six months of provisional protection, and on the other those which go out of existence at the termination of the three, seven, or fourteen years of their more extended existence. We have often thought of doing so, and may still carry it into effect; but usually when describing a patented invention we make use of such terms as indicate the fact of any one such invention being only provisionally protected. In all cases of this kind the invention is open to the public at the expiration of six months from the date of application.

Photographic Society of Great Britain.—The next meeting of this Society will take place at 5, Pall Mall East (when the summer exhibition of the Water Colour Society will be on view), on Tuesday next, the 14th inst., when papers will be read on *Dry Plate Processes* by Mr. W. England, and on *Photography at the Least Refrangible End of the Spectrum,* by Captain Abney, R.E., F.R.S.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For the Week ending May 8, 1878.

These Observations are Taken at 8.30 a.m.

May.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
2	29·87	W	53	55	69	51	Cloudy
3	30·02	W	55	58	65	53	Dull
4	30·11	WNW	50	54	68	47	Fine
6	29·72	SE	55	58	68	49	Fine
7	29·69	W	56	60	69	56	Hazy
8	29·63	W	53	54	60	53	Raining

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 941. Vol. XXV.—MAY 17, 1878.

BROMIDE OR BROMO-IODIDE?

As an example of the manner in which photographic fashions change with time it is noticeable that, though for many years pure bromide of silver plates have almost entirely superseded bromo-iodide in dry-plate work, there is at the present day a tendency in many quarters to return to the old style. Many of those who have quietly settled down to the employment of the simple bromide plates still retain a lingering fondness for at least a trace of iodide in the film, but have been, no doubt, prevented from indulging their fancy in that direction by the difficulties which formerly accompanied the preparation of a bromo-iodised emulsion, except under certain conditions.

The process introduced by Mr. M. Carey Lea, three years ago, in which a small proportion of iodide in conjunction with the bromide is employed, reduces these difficulties to a minimum, provided the conditions laid down by the author are pretty closely adhered to; but if any considerable departure be made from those conditions the results obtained, if not always inferior, are at least uncertain in character. There are other methods, however, at the present day by which a bromo-iodised or even a purely iodised emulsion may be prepared with the greatest ease; hence, if the advantages supposed to be derived from iodide prove to be real, there need be no longer any difficulty in securing them.

It is somewhat difficult to define the exact nature of the claims made in favour of the admixture of iodide; but we believe they lie chiefly in the direction of a more vigorous development, and, as some writers state, greater rapidity. On theoretical grounds, if we consider that iodide of silver alone is *practically* inert to alkaline development, the first claim appears difficult of explanation, while, similarly, the fact that in the dry state, and in the absence of free silver, the bromide is generally believed to surpass the iodide in sensitiveness, the statement that a small proportion of the latter tends to greater rapidity appears somewhat paradoxical.

Though appearances rather incline to favour the latter supposition, we have previously expressed an opinion that the effect produced is not really due to increased rapidity, but rather to the fact that the fainter details develope more vigorously upon a bromo-iodide plate with a given exposure than upon one simply bromised. This throws us back upon the first claim, and we must confess that, as far as alkaline pyro. is concerned, we are entirely at a loss to explain the undoubted fact that the presence of a small trace of iodide does add strength to the development. With any form of silver development (or intensification) the case is different, and we can readily understand that under such circumstances a much stronger image would be secured.

In comparing the results obtained upon the two descriptions of films with a given exposure in the camera, considerable difficulty is experienced in arriving at a decision as to whether the difference is one of sensitiveness or of development. Looking at the question from one point of view it may be argued that, if with a given exposure one form of plate gives printable detail in the most feebly-lighted portions of the picture, while with the other the darker parts have no printing value, the result in the first case is practically equivalent to an increase of sensitiveness. But if we cut down the exposure to such a point that the bromide plate just—and only just—falls short of rendering such detail, and we find that with a similar exposure the bromo-iodide plate also loses in the same manner, it must be evident that the iodide produces no real accelerating effect.

In applying a practical test to the question we have utilised the graduated scale described some weeks ago in our article on actinometers. It is not necessary for this purpose that the instrument be graduated with extreme delicacy, as a wide range of tints is not required. Six or eight tints composed of thin waxed paper will be found to satisfy all requirements should any of our readers desire to perform the experiments for themselves; in fact, the results so obtained will, perhaps, be more conclusive than if a more delicate scale were employed. The only preliminary preparation required is to ascertain by actual trial the exposure necessary to impress some intermediate tint on the scale. By exposing the plates in pairs for the length of time fixed by the experiment the most accurate and interesting information is obtained.

In our first experiment a bromide and a bromo-iodide plate received similar exposures at a measured distance from a gas flame; after moistening with alcohol and washing, they were plunged simultaneously into the developing solution contained in a dish and allowed to remain until the required tint was produced on the bromide plate, when the solution was poured off and rapidly replaced by clean water. It was then found that the faintest tint was rendered with about equal intensity upon each plate, though the deposit differed in colour, being of a colder, almost black, colour upon the bromo-iodide. A second pair of plates were then exposed and treated in a similar manner, but allowed to remain in the developing solution for a very much longer time. In this case, though very little difference could be detected in the appearance of the bromide image when compared with the previous one, the faintest tint on the bromo-iodide plate was much more distinctly marked, appearing by reflected light stronger than the darkest portion of the bromide scale. By transmitted light the different tints were more clearly defined and presented a series of greater contrasts than those on the bromide.

The difference in the behaviour of the two plates under the action of the developer was very noticeable, the best-lighted portion of the bromo-iodide scale appeared first, the action spreading gradually to the lighter tints. The bromide image was slower in starting, but the different tints followed one another with greater rapidity.

In the next experiment the two plates received similar exposures, but were developed separately with the view of pushing the development to its fullest extent in either case. This was repeated several times with variations in the strength and proportions of the developers; but in no case could we detect any advantage on either side in point of sensitiveness. In one or two instances the bromo-iodide showed a faint trace of the next higher tint, while it was indistinguishable on the corresponding bromide plate; upon fixing and drying the latter image and pressing it in contact with a sheet of white paper the extra tint, however, became faintly visible.

Other experiments were made, but the results were in all cases in accordance with those we have detailed; and we are, therefore, we think, confirmed in the opinion we have before expressed—that the addition of iodide confers no increase of sensitiveness upon the emulsion. Its action, however, appears to be beneficial where a more vigorous development is desired, and this is especially the case when silver intensification is employed. For this reason it would seem to be valuable for purposes of reproduction, or for subjects where the natural contrasts are feeble. The colour of the image and its vigorous appearance by reflected light add much to the comfort of development in the feebly-illuminated laboratories, so requisite to success with very rapid dry plates.

DRY PROCESSES—ANCIENT AND MODERN.

V.—ENGLAND'S MODIFIED BEER AND PYRO. PROCESS.—SEBASTIAN DAVIS'S "TOURIST" COLLODIO-ALBUMEN PROCESS.

The process to be first described is fairly entitled to be designated the most modern of all—at least with regard to the time of its publication—inasmuch as it dates back only so far as Tuesday evening last, when Mr. William England read a brief paper on *Dry-Plate Processes* before the members of the Photographic Society of Great Britain.

Let us premise that the process in question is not a *new* one in the ordinary sense of the term—it would place Mr. England in a false position were such a designation claimed for it; still, the fact that a photographer possessing the artistic and manipulative ability of this gentleman finds very decided advantages resulting from the modifications of another process he has adopted is sufficient to warrant us in presenting it as a process entitled to great consideration.

In a recent number of this Journal (April 26), and in the third chapter of the present series of articles on *Dry Processes*, we described the beer and albumen process, which, after modification by Captain Abney, had been adopted by the latter and his friends with a marked degree of success. Among those included in this category was Mr. England, who was accidentally led to make a departure from the routine of the process as previously adopted. About two years ago, during a photographic visit to Switzerland, he was working Captain Abney's process, and while engaged in developing some plates he found that one of them refused to produce an image. This, he soon discovered, arose from its not having been exposed. Having removed the pyrogallic solution by washing he dried the plate, and some time afterwards exposed it, not a little curious to know what would be the result. It turned out to be a negative somewhat superior to those obtained on plates of the same kind when treated in the usual manner. This resulted in his adopting a reconstruction of the process, which may be summed up as follows:—

Allowing it to be borne in mind that Captain Abney applies a mixture of beer and albumen to the sensitised and washed plate, and after washing this off gives it a final coating of beer containing one grain of pyrogallic acid to each ounce—the drying taking place after this treatment—the nature of the departure from this will be understood when we say that the collodionising and sensitising are conducted by Mr. England in the usual way, the plate being then washed, followed by an application of beer without anything else. We are unaware whether or not it was a *lapsus* of Mr. England's, but he appeared to assume that up to this stage he was describing Abney's method, whereas there was no mention whatever of *albumen*, which forms an essential feature of Captain Abney's process. Mr. England next dries his plates, and afterwards gives them a final wash of pyrogallic acid, followed by slight rinsing and drying.

Now, both in the paper and in the course of the few words of further explanation which followed, it appeared to us as if there were something descriptive still further required than that which was given. It may be that Mr. England does not feel justified in speaking of the process in terms more definite than he has employed; but, from his having made the statement that the pictures for which he was awarded a medal at the last exhibition were all taken by this process, he will readily understand the prevalence of a desire to "know all about it." Every one who has had much experience in dry-plate experimental work knows that very frequently a great deal depends upon a very little. At first sight the process does not recognise the employment of albumen at all, and yet if the plates made use of by Mr. England were prepared by Abney's formula this substance must have been present, although in the subsequent modification by Mr. England it is discontinued. It would appear that a preservative or, in this case more particularly, an *organifier* of beer and pyrogallic acid alone is employed, and that these are used separately. The plain beer is applied to the film after it has been washed, and the plate is next dried. This, apparently, is an important element in the routine of preparation, if we rightly understood Mr. England's remarks in reply to a question put after the reading of the paper. After having been dried a one-grain-per-ounce aqueous solution of pyrogallic acid is applied, followed by washing and drying.

This may be thought analogous to the "final wash of gallic acid" which is given with such excellent effect to plates prepared by the collodio-albumen process; but in the latter case the plates are dried with the preparation left on, whereas in the former it is washed off. This particular part of the operation is more in harmony with the method employed by Major Russell, who, after giving the plate a thorough washing, applied a solution of tannin which he afterwards washed off. But whether Mr. England, on the one hand, makes use of pyrogallic acid along with the beer that is first applied, or uses beer alone—or whether, on the other hand, he uses beer along with the pyrogallic acid that is afterwards applied, or prefers an aqueous solution—are matters which each experimentalist may easily determine for himself as to which would be best in his individual experience.

We are here reminded that mixtures of beer and tannin, as well as of simple malt-infusion and tannin, have hitherto been employed with excellent effect in the production of dry plates. The negatives obtained by the aid of these preservatives possess a marked resemblance to the fine example exhibited on Tuesday evening by Mr. England, although the tones are somewhat darker, assimilating in a greater degree to those obtained by wet collodion.

We now pass to a second process, which was also described on Tuesday evening by Mr. T. Sebastian Davis, and by means of which we had before seen most charming negatives produced.

Like that of Mr. England's just described this is likewise a bath process, which, in its original form, was known as the "tourist collodio-albumen process," and is certainly a most trustworthy one. The plate is coated with collodion salted (speaking somewhat roughly) with one part of a chloride, four of bromide, and twelve of iodide, the basis of these being cadmium and ammonium. After the plates are excited in the silver bath they are washed and coated with a preservative composed as follows:—

Albumen	1 ounce.
Solution of extract of raisins (one to five)	1 „
Water	1 „
Ammonia	30 minims.
Ammonium chloride	15 grains.

This is poured on and off several times over the surface and allowed to act upon every part, after which the plate is washed thoroughly. The application of water containing a trace of acetic acid, followed by pure water, will neutralise the alkalinity of the film and thus save prolonged washing. A final application of a three-grain solution of gallic acid completes the preparation of the plates, which keep well both previous and subsequent to exposure.

The solution of extract of raisins alluded to in the above formula requires a few words of explanatory comment. To prepare it let the fruit be torn open or crushed so as to allow the water to have free access to the sugar contained inside. The water added to the raisins must be hot; but it is imperative that it be allowed to stand until it is quite cold before the extract is decanted for use. One part of this extract to five parts of water forms the "solution" mentioned in the formula.

THE FRENCH EXHIBITION.

From a glance at a catalogue of the British Section of the Paris Universal Exhibition, forwarded to us by the Commissioners, we ascertain the position occupied by British photography at this exhibition, so far as that can be deduced from a knowledge of the exhibitors and their subjects. Photographs are to be found under "Class 12—Photographic Proofs and Apparatus"—in which are included "Photographs on paper, glass, wood, stuffs, and enamel; heliographic engravings, lithographic proofs, photolithographic proofs; photographic stereotypes, stereoscopic proofs, and stereoscopes; enlarged photographs; colour photographs; instruments, apparatus, and chemicals necessary for photography; materials and appliances used in photographic studios." Only thirty-five exhibitors rank in the list.

The English display of photographic enlargements appears to be confined to Mr. Vernon Heath, whose fine collection was on view at a recent meeting of the Photographic Society of Great Britain. The Autotype Company also exhibit largely.

Messrs. F. Baum, A. Boucher, Elliott and Fry, R. Faulkner and Co., the London Stereoscopic Company, A. Beau, W. F. Maltby, C. Baudoux, Godbold and Basebe, R. Slingsby, and Herbert Watkins exhibit portraits.

Landscape photography is represented by Messrs. Beauford and Bruce, W. Bedford, T. M. Brownrigg, W. England, B. Lemere, Payne Jennings, P. Mawdsley, Carl Norman and Co., W. Sherlock, W. H. Wheeler, and Matthew Whiting.

"Animal" photography has for its representatives Messrs. A. S. Fisk, D. Hedges, and F. York, whose exhibits are confined to transparencies prepared for the magic lantern.

Genre or composition pictures have for their exponents Messrs. S. Fry and H. P. Robinson, the latter exhibiting the picture for which he obtained the medal at the last London exhibition.

Vitrified enamel photography has its sole representative in Mr. A. L. Henderson. Mr. D. C. Dallas exhibits prints produced from plates and surface blocks; while Mr. L. Warnerke contributes a collection illustrative of the applications of his sensitive negative tissue, with apparatus specially designed for its use. Mr. W. A. Brice exhibits his "photographon." Mr. J. H. Dallmeyer has sent a large collection of lenses of different kinds, and Mr. George Hare cameras, graphoscopes, albums, and other apparatus. Although not mentioned in Class 12, we find in Class 15 ("Philosophical Instruments") that Messrs. Ross and Co. also exhibit a variety of cameras and lenses.

LENS SCREENS.

Any of our readers who are in possession of an old lens will see how in the earlier days it was considered necessary to adopt some sort of shield against the entrance of useless rays of light into the camera, or, at least, against their striking the glass, the result being the time-honoured hood. Latterly, however, many photographers have seemed to think the use of this appendage was "more honoured in the breach than in the observance," and, so far from endeavouring to prevent the access of adventitious rays, they have invited their presence by recommending that even the lens or the inside of the camera should be painted or papered white, or some one of the colours of the rainbow. This fancy was part of the "free" and "after" exposure mania which seized on so many when it was at its height, but which now has probably found its own level—its actual value, we think, having been pointed out years ago in these pages by our esteemed correspondent, Mr. M. Carey Lea.

Putting aside, however, any discussion on the actual merits of such extra exposures, we believe we are right in stating that by no artist of note in the kingdom were they made use of under all circumstances, and hence we may assume that there are at anyrate disadvantages attending their use; and, further, that the old principle of excluding the unused light was perfectly correct in practice. No doubt there are times when the extra exposure may be useful, but the arrangements for obtaining it must be special and separate, and not permanent additions to camera or lens.

Beyond the lens hood supplied by the opticians it was at an early date recommended to adopt an extra screen, and it was the practice of many photographers to do so, one of the earliest we remember being made from one of those familiar, useful wood packing-boxes with the tinfoil bands. The lid was rejected, a hole cut out of the bottom so as just to fit the lens, and the whole of the inside covered with black velvet. This was superior to many of later date, which have been constructed on the principle of a cone. A cylinder may answer well, but a cone has a very objectionable feature, inasmuch as it reflects, even though covered with black velvet, an appreciable amount of white light—far more than with an arrangement having sides parallel to the camera; and, when its pile has become a little flattened by time and use, the cone presents a reflecting surface of considerable power, actually placed in such a position as to send into the camera more light than would enter if no screen whatever were employed.

We are quite of the opinion that the use of a screen of a very complete description should be adopted under all circumstances for portraiture, but for landscape work one of slighter make. For the latter the well-known sky-shade answers nearly every purpose, its ready adjustability to any angle making it of great value. For example: in a case which arose quite recently in our own experience we had promised to take a group of friends, and we found the camera could not be placed in the shade, there being only one spot available for the group. The sun shone immediately into the lens, and it was only by depressing the shade to the utmost that a picture could be obtained. In one way the sun, notwithstanding all our precautions, did just catch one portion of the lens, and the result was, of course, complete fog. The actual rays of the sun possess no special property of fogging beyond their superior intensity, and for the reason that with objects all round throwing into the lens light, white and coloured, their aggregate power has similar effects to that of direct sunlight.

The shape often recommended for these screens is one possessing a circular aperture, but it is obvious that this more expensive mode of construction is not by any means necessary, and, indeed, we prefer one square or oblong as being more useful.

It is worth while here to point out that in designing a shade the longer it can be made the more efficient it is in blocking out all extraneous light, and that a shorter shade with a proportionately smaller section is not equivalent to a long one of a certain aperture. This is a matter of some importance.

We recently inspected a shade made to be used in a studio forty feet long. It was designed so that at that distance from the sitter a series of lines drawn from the outside of the lens, cutting the aperture of the screen and continued to the background, would include only just as much of the end of the studio as could possibly be included in any picture. Hence it will be seen that no light from the windows or skylight could enter the lens, and every source of fog from external causes was removed, this being a matter of vital importance in producing brilliant negatives, when, as at the present time, negatives are made as thin as is compatible with the production of a good print.

If, however, this screen we have described had been made half the length, with an aperture of the size that would be indicated by cutting a cone of rays having the centre of the lens as apex and the screen aperture as base, it is evident that a good portion of the direct light from the sky would enter the lens, unless the windows were constructed on the corrugated principle patented by Mr. Vanderweyde.

We may note a further point of this model screen: it had a hanging velvet flap in front to modify the height of the aperture for different lenses (the *width* was not under control, therefore to this extent it was not the realisation of a perfect ideal), and it was attached to the camera stand by a projecting board fitting in grooves, which allowed its distance from the lens to be under control. It was covered with black velvet, and its owner informed us that it was very essential to keep the lower face free from dust and the pile not pressed down.

As, however, the floors of a studio do not often reflect much light, it is obvious that this lower side of the endless box, as we may term it, is of least importance, and that a very good substitute may be made by simply suspending a piece of velvet over canvas projecting from the camera front to a suitable distance, the chief objection being that where constant work is going on frail contrivances of this nature are apt to get knocked about and injured.

We have also seen cameras constructed in which the sides were continued to an abnormal extent so as to form a screen; but, as they were under disadvantages as regards working the rack and pinion and uncapping the lens, we do not recommend them.

In conclusion: we would strongly advise all who do not use a screen to hasten to supply themselves with one of some kind and to give it a fair trial. We think they would find an improvement in their negatives. A slight veil in the shadows is not of much consequence with a dense negative, but it is ruinous to a weak one.

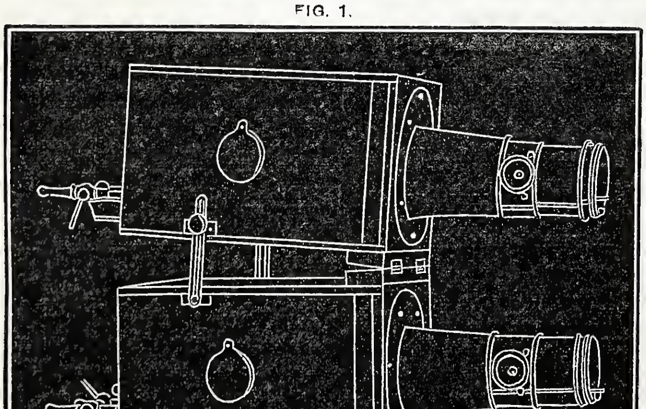
THE iron developer, though almost exclusively employed in wet-plate operations, has as yet found but little application to dry plates, as, for some reason or other, its action appears to lack energy as well as uniformity. An additional obstacle to its employment for this purpose is found in the fact that the solution becomes muddy and exhausted from precipitation of the silver long before the somewhat protracted operation of developing a dry plate is complete, and repeated applications of fresh solution are both inconvenient and inefficient. Many attempts have been made to overcome the latter difficulty by the addition of a variety of restraining agents; but none, so far, have proved practically successful or sufficiently promising to afford a prospect of iron supplanting pyro. for dry as it has done for wet plates. The last expedient we had occasion to notice in this connection was the employment of salicylic acid, as suggested by Herr Richter; but, as we pointed out at the time, in our hands at least, it produced no further effect than to strike a characteristic purple colour when added to the iron. M. Damry, a member of the Belgian Photographic Association, has added to the list another acid which, though by no means new as an adjunct of the developer, has never, so far as we are aware, been recommended for the special purpose. Nitric acid is the agent employed, and, so far as one or two rough experiments go, it seems to act efficiently in preventing the too rapid deposition of the silver. We cannot, however, hold out a hope that it will enable the iron solution to replace pyro.—at least for simply bromised plates—as our experience leads us to believe that no form of silver development succeeds as well as alkaline pyro. in the entire absence of iodide. M. Damry's plates, it may be noticed, are bromo-iodised; hence, probably, the explanation of his success.

A NOVEL MAGIC LANTERN.

ON Thursday evening, the 9th inst., I had the pleasure of exhibiting the above to the members of the Manchester Photographic Society, and by desire of many and for the benefit of others I now request space for a description of the same.

My object in designing this style was to combine simplicity, cheapness, and efficiency. It will be seen from the accompanying

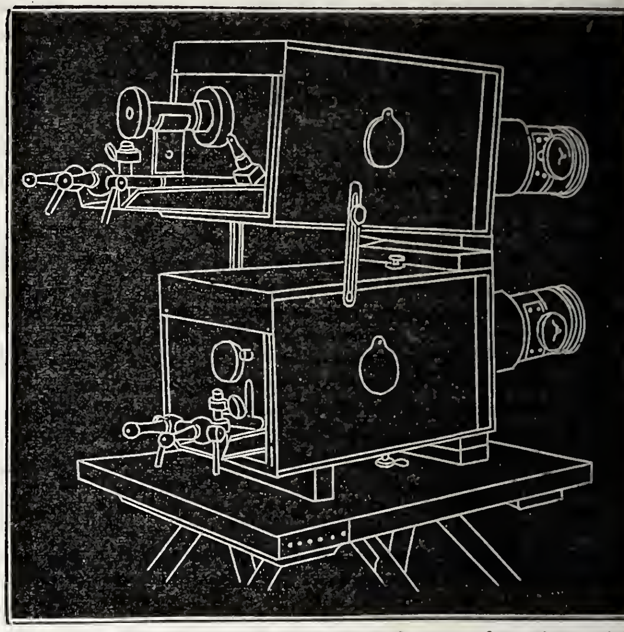
FIG. 1.



drawing, *fig.* 1, which is a perspective, and showing the front and one side of the apparatus, that the lanterns can be separated and used singly if required, and that, if necessary, a third lantern on the same principle may be placed on the top. It will be observed that I have dispensed with chimneys, having found them quite unnecessary. The bodies are made of thin baywood not much larger than cigar boxes, the interiors lined with tin, and perforated in such a manner as to prevent the emission of light while securing the most perfect ventilation.

The discs are brought concentric on the screen by a hinged piece securely attached to the bottom of each lantern, which forms a means of coupling the two, and also of securing them to a table, stand, or tripod-top, as shown in *fig.* 2 (which is a perspective view,

FIG. 2.



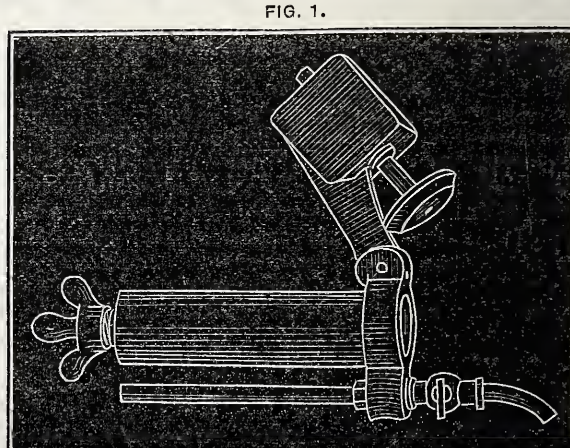
showing the back end). When adjusted they are kept in position by means of a screw in a slotted bar at each side, as shown in the drawings. The tin conical fronts holding the objectives are fixed by screws to the bodies, the flanges of the same having the holes slotted, so that the fronts can be detached instantly, and, if required, can be packed in the bodies of the lanterns. The apertures for the pictures are made the usual width, in which I place my well-known registering carriers. The shutters at the sides cover small blue glass windows through which the light may be viewed. The burners I have adopted are on the "blow-through" principle, the nozzles of which can be removed for cleaning when required. I use the disc form of lime, the holders of same being perfectly adjustable, easily removed, and are manipulated by wood discs placed at their outer ends.

I have found these lanterns to realise my best expectations, and as a good, serviceable, and portable apparatus I have great pleasure in bringing the same under your notice. W. J. CHADWICK.

ANOTHER SAFETY OXYGEN RETORT.

HAD it not been for the interest displayed by the members of the Manchester Photographic Society in magic lantern appliances I

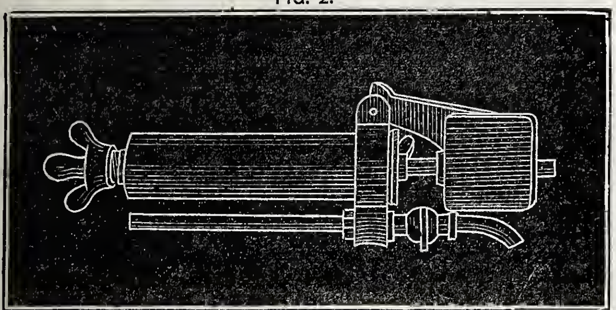
FIG. 1.



should have been reluctant to bring before them another oxygen retort, they having previously seen so many. The accompanying drawings, from photographs, illustrate an oxygen retort adapted for the use of plugs, to which is applied my now well-known safety-valve arrangement, in this instance using a weight instead of springs (both methods of which I have already published).

The principle is clearly shown in the drawings—*fig.* 1 showing the retort open, and *fig.* 2 showing it closed. If the pressure should from any cause rise in excess of that to which it is weighted, the gas would be liberated at the front end by virtue of the weight which is hinged to the retort, and has attached to it the cap-lid in such a manner that it is not quite rigid, but is free to move a little so as to find its proper position. On the cap-lid is a small projection, shown in *fig.* 2, for the purpose of removing any substance which might

FIG. 2.



interfere with the joint, and also permits of the lid being ground into its proper place. The method of opening and closing the retort is simple:—Turn up the weight and the retort is open, or turn down the weight and it is closed.

Plugs of chlorate of potash and manganese may be made and used in thin sheet iron cases if preferred, or a method I have adopted is to make the plugs on a wire, with a sheet iron disc at the bottom end and a small loop at the other (just resembling a sugar crusher). As soon as the plugs dry—which they do much sooner than when bottled-up in a tin case—I dip them in plain manganese and water; this, when dry, prevents any sticking to the retort. Should the plug break, or any part become detached, the disc at the end of the plug, and attached to the wire, on being extracted brings all with it. I must apologise for having trespassed upon so much of your valuable space. W. J. Chadwick.

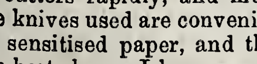
OUR APPARATUS.

No. VI.

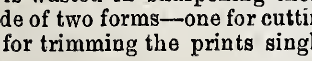
Arrangements for drying silver prints after toning, fixing, and washing are not much varied. For small quantities of work nothing is better than two flat boards with six or eight sheets of stout blotting-paper between them. A sheet of the paper is laid on one of the boards and the wet prints laid evenly upon that. Another sheet is laid upon the latter, and the process is repeated until the sheets are all full. Lastly the other board is laid on, and the whole left to dry. The great advantage of this plan is that small prints—*cartes de visite* for example—do not curl or become inconveniently dry previous to mounting. If there are many small proofs, a frame something like those used in printing-offices for cases of type will hold a series of these boards and sheets of blotting-paper, and is a very convenient plan. For larger work each proof, or number of proofs on one piece of paper, can be suspended by the corner to an American clip attached to a frame. An ordinary clothes horse, set open squarely, with rods (upon which clips have been fastened a few inches apart) laid across from side to side, makes a compact drying-frame. With highly-albumenised paper, and a very dry, warm room this method causes the prints to curl in a very troublesame manner; care must therefore be taken to keep the room at a moderate temperature, and not let the atmosphere be too dry.

Cutting-boards may be made of any hard, close-grained wood. Lime, oak, or box are generally preferred, and, as Mr. Ayres pointed out at a meeting of the South London Photographic Society, by having the end grain up the necessity of frequent planing, as is the case if longitudinal sections of the tree are used, is done away with. Glass plates used for this purpose, although they ensure clean edges, spoil the cutters rapidly, and much time is wasted in sharpening them. The knives used are convenient if made of two forms—one for cutting the sensitised paper, and the other for trimming the prints singly. The best shapes I have seen are these—

NO. 1.



NO. 2.



No. 1 is chisel-shaped, and only sharp on the chisel end; the other edges are nicely rounded. The advantage of this form is that when wooden rules, or T squares, are used the danger of cutting the ruler or chasing off particles of metal to form metal spots on the prints afterwards is reduced to a minimum. No. 2 is more lancet-shaped, and is more convenient to use when only one thickness of paper has to be cut through; it is also adapted for trimming the finished prints.

There is much difference of opinion as to the best kind of block to be used for the purpose of cutting-shapes. Some advocate glass, and others heavy opaque material, such as stone or metal. Much depends on the preparation of the print in deciding this matter. If the negatives are painted round, leaving the subject a trifle larger than it is intended to remain, or if, by aid of a gauge, lines have been ruled on the print, then nothing can be better than a well-shaped metal block; it is less likely to shift or get the edges rough and uneven. If, however, the print has no guiding lines upon it a glass cutting-shape is very useful. The objection to glass shapes is the difficulty of keeping them free from chips; the corners will get broken, which interferes with rapid and accurate cutting. Metal shapes, I believe, are generally adopted when much work has to be got through well.

With regard to plate-cleaners nothing can be better than a flat board with a raised edge and covered with felt, and a lever to retain the plate in position. The screw contrivance that has been so long a favourite with photographers is also a good one; but there is great danger of breaking very thin glass polished upon it by a little too much pressure, which is entirely obviated by the first-mentioned plan. Albumenising has in many establishments superseded this kind of polishing; but, as very dirty plates will require more than a wash and a coat of albumen to make them serviceable, the polishing-board will in all probability yet remain part of the photographer's apparatus for many years to come.

Retouching desks must, to be useful, possess two essential qualities, which are—first, the eyes must be protected from any light except that which passes through the negative to be manipulated; second, that this light must be strong and uniform in quality. In practising retouching with various kinds of light nothing, take it altogether, is more convenient or better than a good gas burner with the light filtered through ground glass. Daylight is too fluctuating, and a paraffine light throws out a large amount of heat and the eyes soon get fatigued and the operator uncomfortable. Evenness and regularity of light is very important. Variations in this respect lead the judgment astray in the matter of intensity. This is particularly the case in repairing a damaged negative, where clear glass has to be stippled to match the surrounding film, so that the patch will print neither darker nor lighter than the film originally did. At the same time I believe that sufficient skill is acquired by those who confine themselves to this work, so that their judgment of density will be pretty accurate in any light. To those, however, whose occupations are more varied an uniform light will be a great assistance. The magnifier attached to the apparatus should be sufficiently large to allow both eyes to be used simultaneously and also be of good quality. An imperfect magnifier injures the sight and induces headaches if used, as is frequently the case, for hours together.

Printing-frames are best with spring backs of the form usually made at the present time. If pressure be applied by means of screws through bars there is much more probability that the negatives or glass of the frame will get broken, especially if left screwed up tightly during the night. They are a dangerous kind of press to use when the negatives are on other glass than patent plate. The least curvature of the glass will be almost certain to induce a fracture. The spring backs are, consequently, much to be preferred, not only on account of the greater ease and rapidity with which the paper can be changed, but for the much less probability of breakage in their use. Woollen or felt pads are best to use in them, as they do not absorb moisture so rapidly in damp weather as many other materials. These should be very thick and close in texture. If thin, the paper is much more liable to cockle. A pad composed of several layers of *thin* material will allow the paper to cockle much more easily than one of thick, no matter how much pressure is applied. The backs of the presses should be perfectly true and level, and the boards of which they are constructed clamped, for the slightest warping is fatal to good and perfect prints. Especial care must be taken, when examining a pressure-frame as to its fitness for work, to ascertain that it is perfect in this respect; also that the springs are sufficiently strong to retain the back in its proper position when partially opened to examine the progress of the printing. Many printing presses fail in this respect, and give rise to much trouble. The plate glass must be free from scratches and markings. In the course of time, with constant use, the glass will be scratched more or less. Slight scratches are of little consequence, but deep ones will retain dust and dirt, making a white mark on the print, or by reflecting the light from their rough edges make a dark one. In placing the glass in the frame the most defective side should be placed outwards, so that the thickness of the glass may interpose and soften the markings, or render them of slight consequence, which would, if placed close to the negative, spoil the proof. It is also necessary to ascertain that the rebate on which the glass rests is of the same height all round, and that no nails or other hard substances interfere with the level, as either may lead to a fracture of the glass. E. Dunmore.

THE PHOTOGRAPHIC PRINTING PROCESS USED IN THE PORTUGUESE STATE PRINTING ESTABLISHMENT.*

IV.—Photolithography, with the Employment of Tinfoil.

The exposure of prepared stones under the negative seldom gives good results, because it is very difficult to produce an intimate contact between two such rigid substances. The transfer with paper is also not very exact, because the paper, especially when in a moist condition, is too flexible and becomes warped. I have, therefore, sought for another substratum, and have found it in tinfoil. The sheet of tinfoil is first flattened upon a well-polished lithographic stone with a very fine grain. Too great a pressure destroys the flexibility of the metal and makes it easily torn; too smooth a stone does not allow the tinfoil to adhere to it; too rough a stone interferes with the fineness of the upper surface and causes spots to develope on it when rolled.

The flattened tinfoil sheets are made perfectly clean, and then laid flat, without creases, upon a zinc plate moistened with water and levelled as if for engraving upon. If in spite of care creases are formed the tinfoil sheet should be lifted up and the creases allowed to spread out when laying it down again; or the tinfoil should be pressed out as smooth as possible and then made perfectly equal by rubbing with a damp and very soft and flexible ball. The sheet is then cleaned by rubbing it lightly with a linen rag dipped in a ten-per-cent. solution of caustic soda or caustic potash. If that be not sufficient add a little whiting. Then wash the caustic lye completely off and put on the sensitive fluid with a soft, flat pencil. In order to spread the latter dissolve in the water bath—

1.

Good gelatine	40 grammes.
Water	500 ,,

Then dissolve in another vessel—

2

Bichromate of ammonium	20 grammes.
Water	500 ,,

These two solutions are mixed in a lukewarm condition and filtered through double flannel or sponge. The best gelatine is that which is still firm at a temperature of 35° C. but is not difficult of solution. The film should be equalised as much as possible, so as to show neither streaks nor inequalities; also, there should be no free places (or holes in the film) caused by the tinfoil being imperfectly washed. As long as the chromated gelatine is wet one may work by daylight, because when wet it is not sensitive to light; in the stiffened or dry condition it should only be displayed to yellow light.

The sheet of zinc upon which the leaf of tinfoil lies must be placed in a horizontal position and warmed by gas or in a drying-box. When the gelatine film is quite dry the sheet of tinfoil is stripped off the zinc plate, and one may then proceed to expose, which can best be done on a clear day. The gelatinised sheet of tinfoil is laid upon the negative, and a roller covered with flannel is passed over it in order to bring it into absolute contact with the glass. The negative is then placed in the printing-frame. The exposure lasts, in the sun, from five to twelve minutes; in the shade three times as long. If the ground of the negative be perfectly opaque a longer exposure may be given without doing any harm; but if the ground be rather transparent it is better to expose in diffused light than in the sun. The rolling of pictures can be most successfully done the same day as the foregoing, but may be postponed until next day.

The sheets of tinfoil should now be dipped, picture side uppermost, in cold water; then they are laid, wet as they are, upon a perfectly level stone. A wooden roller covered with flannel is used to press them flat upon the stone and to remove the water from their upper surface.

The inking is done with a lithographic roller, furnished with a mixture of two parts of transferring ink to one of printing ink. The composition of the foregoing may be varied to a certain degree, which is dependent on the temperature. It should, however, contain no varnish, as that would make the ink too fluid.

The attainment of the desired result depends here solely upon the skill of the worker. The roller must be very good, somewhat slippery, and should not hold too much ink. The inking is difficult when too much water remains upon the plate, and when the lighting is too short. In that case a more fatty or fluid ink is taken; or, better still, one begins again at the beginning of that process.

If the tinfoil become smeared between the lines, spread over it a very thin layer of starch paste or a still thinner film of gum arabic, and rub out the spots with a very soft sponge. If that do no good rub it with gum and flannel. In this way the affinity of the ink for the surface is diminished, but it may also happen that the drawing may be rendered too weak. If the exposure be too long, so that the tinfoil takes on the colour too readily and becomes smeared, moisten the surface with turpentine and clean it off; then roll anew so that the metal may receive a thin coating of gum water. With care good results may be got in this way.

A thick film of chrome gelatine is easily raised up and torn during the rolling; too thin a film is easily smeared with ink.

When the picture has been well inked the tinfoil is washed with water and left two or three hours to dry. It is now rolled again with ink. It is then washed once more. The sheet of foil is now taken from off the stone and hung up to dry. The picture is then transferred in the usual way to the stone.

V.—Photozincography.

For this a reversed or drawn-off negative is necessary. A thin, well-planed zinc plate gets a fine granulation by the application of pumice stone, is cleaned with potassic or sodic lye, and coated with the following film:—

Gelatine	3 grammes.
Bichromate of ammonia	1 gramme.
Water	100 grammes.

The dry film is exposed under the negative, in the sun, for two or five minutes; in diffused light three times as long. It is rolled by means of a leather or caoutchouc roller with a mixture of printing ink and transferring ink, and then allowed to lie for two or three hours in cold water. At the end of that time, if a good lithographic roller be passed over the film, the picture developes and the superfluous colour is carried off. The picture is then laid in warm water in order to dissolve the unlighted parts; it is now allowed to drip, and the following mixture poured over it:—

Water	1 litre.
Gum arabic	40 grammes.
Cupric sulphate	2 ,,
Gallic acid	5 ,,
Nitric acid	0·5 of a gramme.

This is allowed to dry. Print with a typolithographic press. The lithographic press is not very available, because the rubber injures the drawing. The latter may be replaced with advantage by a roller covered with felt. The ink is carried over the slightly-moistened plate by a lithographic roller. José Julio Rodrigues.

(To be continued.)

TRANSATLANTIC NOTES.

In continuation of the jottings connected with my visit to the establishment of Mr. Gutekunst, I would direct attention to the beautiful effects secured by the etching in of designs as background and accessories, so as to entirely alter the nature of the picture.

There lies before me while I write a charming specimen of this kind of work. The subject is a picturesque porch, some fine trees, a series of ancient-looking steps, and sundry other things required to make up an artistic composition. Inside the porch, and looking out of a window, is a lady holding a baby seated on the window sill. A little in front, and to the right of the window, there is seated, amongst a cluster of flowers and shrubs, a boy, the whole forming about as perfect a picture as one could wish to see. The original from which this beautiful composition was produced was an interior with a pillar in the centre; the child was held on the pillar by the lady, and the boy seated at the base. This was, as all Mr. Gutekunst's pictures seem to be, a fine composition; but, of course, there is a limit to the demand for a family group from even the most perfect negative. A new interest, however, is given, and consequently a new demand arises, from a new combination, when it is really artistically beautiful.

To produce this Mr. Gutekunst stops out the background of the original, and prints the figures only on a plate with a plain opaque background. This is handed over to an artist cunning in this kind of work, who with a sharp-pointed instrument scratches in whatever design his fancy may suggest, and with a little opaque colour puts in such high lights as he may think necessary. Of course this is not

* Continued from page 196.

photography pure and simple; but it is a combination of photography and art which produces exquisitely beautiful results, and which will undoubtedly "bring grist to the mill." I hope Mr. Gutekunst will persevere in his determination to cultivate this branch of combined art, and that some of our artists at home will follow the excellent example, and equal, if not surpass, their *confrères* of the west in the production of the almost unlimited effects thus easily obtained.

The flavour of last year's Centennial Exhibition is still strongly felt in Philadelphia, and in a less degree all over the States. Photography seems really to have had a "good time" of it during the run of the exhibition, and in the hands of Mr. Wilson, publisher and editor of the *Philadelphia Photographer*, who was the enterprising contractor for the privilege of photographing in the exhibition and its surroundings, it has brought both fame and profit to himself and those associated with him. The speculation was undoubtedly a bold one, as the outlay was very great, and the result very problematical. The mere building in which the operations were carried on cost £3,000. It was to be brought to the hammer the day after I had the pleasure of "interviewing" Mr. Wilson, and would not likely bring more than a tithe of that sum. The fittings and apparatus were being brought to his office from the exhibition grounds, and included more than a lorry load of printing-frames alone. Amongst the pile of apparatus which was lying about in all directions in the various apartments of which his establishment consists was one piece which will serve as a proof that no expense was spared in making everything as perfect as possible. It was a burnisher similar to the kind so generally in use for small work in England and Scotland, but with a roller, and, of course, corresponding burnisher, thirty inches in length. This had to be made to order, and must have been an expensive tool; but then, as I have already said, America is a country of big things. I had the pleasure of looking over a set of prints from every negative taken during the exhibition, and while many of them were, from the nature of the subjects and the conditions under which they were photographed, scarcely as good as could be desired, they were, on the whole, very high-class work indeed.

The stereoscope, I am glad to see, is still a popular instrument with Americans, and while in Mr. Wilson's warehouse I had ample evidence that the stereoscopic pictures of the Centennial Exhibition are very much in demand. Such enterprise deserves to be well rewarded, and I hope that the very excellent series of pictures, or rather the negatives from which they were printed, will be "a dripping roast" for a long time to come.

A visit to Philadelphia would hardly be complete without a call on Mr. Marcy, of sciopticon fame. I found him in a comfortable first-floor, at 1340, Chestnut-street, surrounded by several members of his family, each apparently as enthusiastic in the lantern business as himself. I have said a "*comfortable* first floor," but must in some degree modify the adjective, as, like almost all American houses, it was heated to an almost unbearable temperature by a large stove, although the day was as hot as most English or Scotch summer days. Mr. Marcy seems to have been a school teacher with a *penchant* for physical science, more especially for that of optics as applied to the lantern. I was, as usual, very heartily received; and as a part of one of the walls of a large room is painted a pure opaque white, oxygen and hydrogen always laid on, and each window furnished with an outside *jalousé*, whereby it can be made quite dark, we had a sciopticon exhibition in a few minutes. Mr. Marcy has evidently a large business both in apparatus and slides. I saw some very fine specimens of the latter of both continental and American manufacture, but, curiously enough, not one of either English or Scotch production. This will, no doubt, be remedied soon; but there is one absurd drawback to the importation of foreign slides, in the shape of a stupid excise duty of, I think, forty per cent. on manufactured glass, while the no less stupid heads of the customs department insist on the vitreous character of the slides, and insist on that duty being paid on all that are imported. While speaking of lantern pictures, I may say that I saw in the hands of several of the amateur members of the Philadelphia Photographic Society a large number of those productions, both from emulsion plates and wet collodion, quite equal to anything that can be shown at home.

So far as the sciopticon is concerned Mr. Marcy had no improvement to show that has not found its way to Europe during the last year, except what was not inaptly called, by the ex-President of the Philadelphia Photographic Society, "a winker." It is an automatic means of entirely shutting off the light at the instant of changing the pictures, and so preventing the line caused by the two strips of mounting paper and the not infrequent streak of light which passes between them being seen. It consists of a small blacked plate of sheet brass or tinned iron fixed to a wire lever which passes out through the side of the lantern, and so arranged that the passing of the slide along the adapter brings it right in front and close up to the source of light, keeping it in that position till the new picture is in position, when it immediately descends and allows the light again to fall on the condenser. I have no doubt the arrangement of this simple apparatus will be obvious to all who use lanterns; and as the cost need not be more than a few pence, and it is a great improvement, I hope to hear that by next season it will be largely adopted by our photographers at home.

I was sorry to leave Philadelphia without seeing Mr. M. Carey Lea, whose writings have so long interested the readers of The British Journal of Photography and the photographers of Europe and the world generally, but he only comes into the city occasionally, and was not to be in Philadelphia till after the day I was obliged to leave. I called to say "good-bye" to Mr. Gutekunst, who made me almost ashamed by presenting me with a large number of the finest specimens of his best work, including two magnificent panoramas printed from a number of negatives in such a way as to elicit the admiration of all who have seen them, and which I shall have much pleasure in showing to all who desire to see them on my return to Edinburgh.

On leaving Philadelphia matters unconnected with photography required my presence on the banks of the beautiful Susquehannah river, and I had a nine-hours' ride in an express train through the grand and delightfully-photographic "Lehigh Valley," halting for a few hours at "Waverley," in New York State, tempted as much by the associations of the name as by the beauty of the village.

But as this communication is probably sufficiently long, and as kind friends are waiting to give me occupation in a way more congenial than even letter-writing, I shall reserve what I have to say of photography in this and some other villages for a future "note."

John Nicol, Ph.D.

FOREIGN NOTES AND NEWS.

Braun et Cie.'s Reproductions of the Italian Masters.—The Berlin Exhibition of 1879.—Death of Freidrich Voigtlander.—To Sensitise Tissue without a Chromium Bath.—Dr. Adolf Ott on White Carbon Tissue.—New Rapid Dry Process.

The agents of the firm of Braun et Cie., Dornach, are at present in Italy photographing the masterpieces of Raphael, Michel Angelo, Da Vinci, &c. The task is likely to be difficult, and to occupy several years in its execution, as the works to be copied range from the fourteenth to the sixteenth century. The results will, most probably, be published from time to time.

There is a notice in the current number of the *Mittheilungen* to the effect that at the Berlin exhibition, which is to be held next year, none but Berlin firms will be permitted to exhibit. The photographic exhibition at Brussels, in connection with the annual general meeting of the Belgian Photographic Society, was opened on the 12th inst., at the *Musée Royal de l'Industrie.*

The same journal announces the death of the celebrated optician, Herr Friedrich von Voigtländer, which took place in Brunswick on the 7th ult. The deceased was born in Vienna in 1812. He was educated with the intention of succeeding to his father's business. It was not until, along with Herr Petzval, he brought out the first photographic portrait lens—that associated with his name—that he became known. What it was before impossible to do without an exposure lasting several minutes was accomplished by means of the Petzval-Voigtländer lens in as many seconds, and the new instrument soon became the photographer's greatest treasure, carrying the name of Voigtländer all over the world. Some time later Voigtländer made, from Petzval's calculations, the orthoscopic lens, which was in turn superseded by the triplet and the aplanatic. In 1848 Herr Voigtländer removed to Brunswick, where his establishment is now carried on by his son Friedrich.

In the *Archiv* Dr. Monckhoven gives the following directions for sensitising carbon tissue without a chromium bath:—"Dip some common carbon tissue into an aqueous solution (20%) of citrate of iron oxide and ammonia, dry it in the dark, expose in a printing-frame, damp it, and place it, as usual, on a glass plate. On developing with warm water no picture will be visible; but if, after exposing the paper instead of dipping it into water, it be dipped into a solution of bichromate of potassium, and immediately afterwards be laid on the glass plate and developed in warm water, a picture will be got, owing to the actinic action being transferred from the iron to the chromium salt. Instead of the bichromate of potassium, mercuric chloride or other salts, which I shall name at a future time, may be used. If tannin be used the action of the light is reversed, and a negative is produced in place of a positive. Instead of the iron salt other metallic salts may be used whose bases are oxidised in various degrees. What gave me the most trouble in this process was the preservation of the half-tones."

In the course of a long letter from Dr. Adolf Ott, in the *Wochenblatt*, the writer says that of late his firm (Braun et Cie.) have had numerous inquiries for white carbon paper, but that, owing to a pressure of other business, they have not yet been able to supply it. He also says that he does not clearly see what are the advantages to be obtained by its employment, as, though perhaps few carbon printers may have observed the fact, the contour of the image is slightly visible even on dark carbon tissue. If a piece of dark tissue which has been fully exposed under a negative be taken into a dark room, and a pencil of light be allowed to fall on it, a weak impression of the negative may be recognised without difficulty. The cause of this is that the action of the light has caused a slight change of colour, by changing the yellow potassic chromate into brown oxide of chromium. To distinguish the picture only requires a little practice, and MM. Braun et Cie.'s printers seldom make a mistake as to the length of exposure. Dr. Ott thinks this method of determining the length of exposure preferable to the use of a photometer, as the action of the light on the edges of the picture, where the photometer is always exposed, is much weaker than in the centre.

M. Albert Damry communicates to a recent meeting of the Liege section of the Belgian Photographic Association the details of a rapid dry process which he has for some time worked with considerable success, and specimens of which were exhibited. It is based upon the employment of an ordinary bromo-iodised collodion in conjunction with the silver bath, and presents in itself but little novelty, the preservative consisting of a mixture of dextrine, tannin, and gallic acid. The development, however, introduces a novel feature; the principal solution consists of the ordinary mixture of ferrous sulphate, acetic acid, and water, from twenty to twenty-five grains to the ounce. In conjunction with this are employed a five-per-cent. solution of nitrate of silver, acidified with nitric acid in the same proportion as the silver, and an infusion of linseed prepared by boiling for a short time—one ounce of linseed with ten ounces of water—and filtering. Equal parts of the iron solution and the infusion of linseed are mixed and a few drops of the acid silver added; this forms the developing solution, and an additional quantity of silver is added for intensification. It is not stated what *rôle* the linseed plays, but the process is said to be extremely rapid, requiring no more than twice the exposure of a wet plate.

Contemporary Press.

PHOTOGRAPHS OF OFFENDERS.

[Standard.]

The chief of the Berlin police has, according to the *Russian World*, presented to the chief of the St. Petersburg police a richly-bound album, containing photographic portraits of the various criminals who have passed through his hands; and this valuable gift is said to have been accompanied by a request from Herr von Madai that his eminent colleague in the suppression and punishment of crime would forward him a similar collection of Russian offenders. The Berlin police-master has, it further appears, sent copies of his album of suspected and convicted malefactors to all the great capitals of Europe and to several cities usually deemed of minor importance, but which apparently rank high in the statistics of crime. That the album of Prussian wrongdoers should be sent to such populous centres as London and Paris is intelligible enough; but what have Hamburg and Bremen done that they should be made the object of such marked compliment, involving, as it does, a similar attention in return? These seaports are probably looked upon as last resting-places for the absconder about to quit Germany for a voyage across the Atlantic, and it has probably not been forgotten that it was from Bremen that a few years ago the explosive apparatus was to have been shipped which burst prematurely on the Bremen quay. Hamburg, again, besides being an important seaport, is a great commercial city, and wherever business is carried on a certain proportion of business frauds must, of course, be expected.

Frankfort, as the head-quarters of German finance, was not likely to be forgotten, and Frankfort has received its black book, and will, doubtless, in due time, send its own black book in exchange. Where capitalists assemble thither will those whose aim it is to prey upon capitalists be naturally attracted; and though Frankfort is by no means a large city, its inhabitants need not feel hurt at being classed with the places in whose midst Herr von Madai believes that a large number of criminals habitually lurk. Those who know Baden-Baden in its new aspect, since the abolition of the gaming-tables, the partial suppression of the races, and the desertion of the place by the fashionable world and half-world of Paris, will find it difficult to believe that this most delightful of all inland watering places can be a favourite sojourn for breakers of the criminal law. But heavenly bosoms sometimes harbour rage; a glittering halo may hover round fury; and Baden-Baden, with all its beauty and all its calm, is no better than it should be, and has been esteemed worthy of that somewhat compromising gift, the photographic album edited, strictly for private circulation, by the chief of the Berlin police.

* * * * * * * * * * * *

Photography has done so much for criminals that it may be doubted whether, on the whole, this, like many other modern inventions, has not benefited them quite as much as it has injured them. In many of the large prisons the inmates are photographed, so that, in case of their returning after their liberation to evil ways, there may be no mistake as to their identity; and in some French prisons the photograph of the criminal is accompanied by a succinct and impartially-written memoir, that the police may be able to master at the same time the features of the convict and the leading incidents in his life. This seems hard upon the convict; but how often has he not brought himself beneath the action of the criminal law by a too ingenious use of photography, and especially of photolithography, in connection with the production of bank notes!

It would be interesting to know which first turned photography to effective account—the thief-taker or the thief. Probably the latter. For the police, as soon as they hit upon the notable expedient of photographing criminals, proclaimed the fact to the whole world, that the whole world might admire their cleverness. The criminals did not, of course, do anything of the kind. They behaved with modesty, or, at least, with discretion, executing their photographic reproductions as quietly as possible, and never once boasting of the ingenuity they had shown in turning the new process to a use which had probably not been contemplated by its inventors.

Who, again, is to say whether railways and the electric telegraph have, on the whole, been favourable or unfavourable to the practice of thieving? The thief can be followed quickly enough by train; but by the same means he can get away quickly. In railways, too, he found a new scene of action. How many robberies have been committed at railway stations and in railway carriages, from robbery accompanied by murder to simple card-sharping. In England the "road" had already lost its ancient glories when railways were first introduced. But in Spain and Italy, where brigandage still flourished, highway robbery was varied in form so as to suit the new conditions of travelling, and in both these countries banditti learned to stop trains either by placing obstacles on the line and signalling that they had done so, or by the simpler means of letting what they had done produce its natural effect.

The electric telegraph, again, though it has helped to facilitate the capture of criminals, has also enabled them in many cases to avoid being taken. It has been the means, moreover, of putting money in their pockets. There have been numerous instances of thieves telegraphing in false names for remittances to be forwarded immediately to some foreign hotel, where the supposed sender of the telegram might be, but, as a matter of fact, is not staying. A house of business—a bank, for instance—would pay no attention to such a message, except to request that it might be repeated by letter. But numbers of private persons receiving such a demand, as if from a friend, would do what was desired, and, regarding the case as one of urgency, would reply at once without a thought, and indeed without any possibility of making inquiries on the subject.

Among the class of men whose photographs Herr von Madai places in his album are many who are ingenious enough to work telegraphy, photography, and every kind of new invention in various ways, and always to their own immediate advantage. It is right that the tables should sometimes be turned upon them, and the new international exhibition of criminals which the Prussian police-master is endeavouring to organise will probably be found a valuable aid to the effective working of the beneficent principle of extradition.

Our Editorial Table.

Sensitive Plates. By R. Kennett.

We have received and tested a sample of sensitive plates prepared by the gelatino-bromide process. These reveal the fact that Mr. Kennett's hand is not losing its cunning as regards the preparation of gelatine plates, which, to his credit be it recorded, he was the first to introduce commercially to the public.

We have already alluded to the fact that when Mr. Kennett first introduced these plates he prepared them possessing such a degree of sensitiveness that he had great difficulty in inducing photographers to give them a sufficiently rapid exposure. Except under very exceptional circumstances dry plates having a degree of rapidity equalling that of wet collodion had not been met with previously, and there was thus a certain excuse to be pleaded for those who failed at once to realise the altered condition of things. To meet this difficulty Mr. Kennett, at the suggestion of ourselves and others, very wisely issued plates of a lower grade of sensitiveness, or about that of wet collodion—a step which, so far as we have been able to ascertain, has given universal satisfaction. While they are still sufficiently rapid for nearly every purpose, permitting "instantaneous" views to be obtained in a good light, there does not exist the necessity for developing them in a room from which light has been excluded almost altogether—a task extremely difficult and irksome to persons having eyes of only average quality.

The plates we now bring under notice are technically perfect, possessing, as they do, freedom from any mechanical imperfection. They are also very tensile as regards the exposure they may receive. Having given one of these plates an exposure six times longer than that given to another, the subject and lens being the same in both cases, we have obtained good negatives on both. The whole secret consisted in treating the intentionally over-exposed picture to a weak bath of bromide of potassium previous to applying the pyrogallic acid. We are not aware what has been Mr. Kennett's experience in connection with the "frilling" of the gelatine film of his plates; but we have never experienced such a mishap since we adopted the very simple expedient recommended by some writer of whom we have no recollection at present, which consisted in dissolving a pinch of Epsom salts in the water used in the washing, and developing the plates. Soft water sometimes produces frilling; any method by which the water becomes hardened provides, however, an effectual remedy for the evil.

Catalogue of Photographic Apparatus.

London: Wratten and Wainwright.

We have received from Messrs. Wratten and Wainwright, of Great Queen-street, their new *Illustrated and Descriptive Catalogue of Photographic Apparatus and Materials.* In addition to the comprehensive matter it contains as a catalogue, and in which are comprised cameras, lenses, stands, rolling-presses, and the variety of chemicals and preparations employed in photography, there are appended "Notes on Processes," in which we find epitomised much useful information. We present, by way of specimen of this department of the catalogue, what is said concerning one of the processes of the day, namely, *Gelatino-Bromide Emulsion*:—

"Inasmuch as some of our clients who are sufficiently advanced in the routine of wet-plate and dry-plate photography have manifested a desire to make their own dry plates, but have not been well acquainted with the best manner of setting about it, we give the following practical details of the gelatino-bromide dry plates, and we hope so simply and lucidly that their meaning may be easily comprehended.

"To make five ounces of gelatino-bromide emulsion:—

Formula.

Gelatine (Nelson's No. 1)	90	grains.
Ammonium bromide	45	,,
Silver nitrate	75	,,
Water (distilled)	5	ounces.

Select a twenty-ounce bottle with a securely-fitting stopper. First pour in four ounces of the water, dissolve therein the bromide of ammonium, then add the gelatine, and leave to soak for one hour. The advantage of a well-fitting stopper will be obvious; for if, in shaking up, any of the liquid were lost, some of the bromide salt would go therewith, and the balance would be disturbed. There is a manifest advantage in first dissolving the bromide salt in the water, for we thus succeed in evenly and equally distributing it throughout the whole body of the gelatine; and, if precaution be taken in regard to the stopper of the bottle, there need be no loss of bromide. Next, dissolve in a separate bottle seventy-five grains of nitrate of silver in the remaining ounce of water. Place the two bottles in a jar or jug of water of 100° temperature, and solution of the gelatine will quickly take place. Now carefully unite (in the dark room, of course) the contents of the two bottles. The nitrate of silver solution may be slowly stirred into the bromised gelatine, or it may be added in small quantities with a thorough shaking between each. Either method, if *well* done, is efficient. We have now a gelatino-bromide emulsion containing a slight excess of bromide, and this slight excess, while not in any marked degree detracting from its sensitiveness, will be found of eminent service when we arrive at the developing stage. By the addition of the nitrate of silver to the bromised gelatine an action termed 'double decomposition' is originated; in other words, an interchange of elements takes place between the two salts. If nitrate of silver were added to water containing bromide of ammonium in solution an interchange of elements would instantly take place; insoluble bromide of silver would subside, and nitrate of ammonium would remain in solution. But gelatine, being a viscid medium, retards this chemical interchange, and therefore time must be given to bring it completely about. In order, therefore, to keep the gelatine in a liquid condition we place the bottle in water of 100° temperature, and it is found in practice that a period of from four to six hours will complete the double decomposition.

"If water of a higher temperature than 100° be employed the interchange will be completed in a shorter space of time, as the gelatine, being thereby rendered more limpid, presents less obstacle. But we must bear in mind that 100° is a safe temperature, and that a higher temperature can only be employed at the risk of decomposing the gelatine, the results of which would be inconvenient at the final stage of development, these results being blisters and frilling.

"A period of six hours having been given for digestion, take out the bottle of gelatino-bromide emulsion, and pour the emulsion into a flat dish to *set*, and when so *set* the final operation may be performed. It will be seen from the foregoing remarks that the gelatine holds in suspension two compounds—bromide of silver and nitrate of ammonium. The former is the sensitive salt; the latter is matter in the wrong place, and must be removed, or it will crystallise on the plates and spoil them. In order to remove the nitrate salt in the most effective manner we have found the following method all we could desire:—

"*Apparatus Required.*—1. A bag made of that "napless" canvas which ladies employ as the basis for Berlin wool work.—2. A trough, say twelve by ten inches, and ten inches deep, and fitted with tap to draw off the water, with a ledge around the inside, about two inches from the top to support.—3. A tray with wood sides and *calico* bottom.

"Scrape the gelatine up with a strip of glass, and transfer it to the canvas bag; close the aperture of the bag, and, by the pressure of the thumb and fingers, force the gelatine through the meshes of the canvas into a basin of water. We now have the gelatine in extremely fine division; but it is also mixed with a vast excess of water. Now we pour the whole on to the tray with the calico bottom, and the water will pass off, leaving the gelatine high and dry. In order that we may be sure that the proper amount of work is done, it is well to fill up the trough with a fresh supply of water, and let the tray float upon it for ten minutes.

"When the water has been finally drained off we transfer the gelatine to a bottle, stand it in hot water, and when dissolved and filtered it is ready for coating the plates. This latter operation is difficult for a beginner, and inasmuch as the plates require a long time to dry—from twelve to twenty-four hours—he must have a room or a drying-box fitted up expressly to keep out light during drying. When the plates are coated they must be laid on a *levelled* surface to become set, and so soon as set they may be stood up or placed in the box to dry."

The foregoing extract conveys a fair idea of the manner in which these "Notes on Processes" have been prepared.

The Forty-Fifth Annual Report of The Royal Cornwall Polytechnic Society.

We are placed at a slight disadvantage in noticing this comprehensive *Report* on account of the fact that, although it was only presented at the forty-fifth annual meeting of the Society which was held during the present year, the exhibition, with which the *Report* mainly has to deal, was held in September last year, and in our issue of the 7th of that month we were enabled to publish *in extenso* that portion which possesses the chief interest for photographers. From the catalogue we find that the number of professional photographers who exhibited on that occasion was twelve, there being only six amateur exhibitors. Nine medals in all were awarded to these exhibitors.

The following is the list of prizes offered for the next exhibition:—

Sec. I.—Professional Photographers.

1.—For the best landscape, size not less than 14 in. × 11 in.—a silver medal.
2.—For the best landscape, size not less than 11 in. × 9 in.—a bronze medal.
3.—For the best landscape by the collodion emulsion process, size not less than 9 in. × 7 in.—a silver medal.
4.—For the best landscape by the gelatine emulsion process, size not less than 8 in. × 6 in.—a silver medal.
5.—For the best interior by any process, size not less than 11 in. × 9 in.—a silver medal.
6.—For the best portrait, taken direct, size not less than 14 in × 11 in.—a silver medal.
7.—For the best portrait, size not less than 10 in. × 8 in.—a bronze medal.
8.—For the best group, composition or otherwise, size not less than 14 in. × 11 in.—a silver medal.
9.—For the best enlargement landscape (in carbon), size not less than 20 in. × 16 in.—a silver medal.

The judges may decline to make any award in any of the above classes where there are less than three competitors in that class.

All work that has been elaborately touched, either on the negative or print, will be excluded from competition. Slight spotting only allowed.

(*Carte-de-visite* portraits are excluded from exhibition.)

Sec. II.—Amateurs.

Medals are offered for productions in this department.

The University Magazine.

London; Hurst and Blackett.

The May number of the *University Magazine* contains as the subject of its series of "Contemporary Portraits" that of the Right Hon. W. H. Smith, M.P., First Lord of the Admiralty. It is printed by the Woodbury mechanical process from a negative by Lombardi and Co., the likeness being most striking and characteristic. The general articles, of which this excellent number of the *University Magazine* is composed, is of the usual advanced and attractive character.

Burlington House.

London: 15, Russell Street, Covent Garden.

This is the first issue of a new quarterly devoted, critically, to the Royal Academy, Museums, Universities, learned Societies, and Burlington Debating Association, its editor being Mr. C. O. Groom Napier—a gentleman whose name is well known to the members of the British Association. The general contents are not calculated to interest photographers as such, although photography has been employed as a medium by which to illustrate one article—*Ancient Knowledge of Precious Stones*—which it does in an effective manner.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The usual meeting of this Society was held on Tuesday last, the 14th inst.,—Mr. James Glaisher, F.R.S., President, in the chair.

The minutes of the preceding meeting having been read, the President alluded in feeling terms to the death of Mr. J. A. Spencer, and expressed sympathy with Mrs. Spencer.

Messrs. J. L. Montifiore and John L. Güger were elected members; after which the President presented to Mr. Henry White, a former treasurer, the medal which had been awarded to him in recognition of the services he had rendered to the Society.

Captain ABNEY then read a paper on *Photography at the Least Refrangible End of the Spectrum, and on Some Photographic Phenomena.* In the course of his communication Captain Abney exhibited a variety of negatives of spectra. Some of these were obtained by diffraction gratings ruled on speculum metal by Mr. J. M. Rutherfurd, of New York, two of which gratings were exhibited to the members—one containing 17·280 and the other 8·620 lines to the inch. The others were obtained by prisms. The second part of Captain Abney's subject was that which will possess the highest interest for practical photographers, as it formed a sequel to his paper of last year *On the Destruction of the Photographic Image by Means of Various Oxidising Agencies.* This paper will appear in our next.

The CHAIRMAN, in tendering the thanks of the Society to Captain Abney, said that the experiments described were quite unique. He had never before seen solar spectra of such perfection, and they must have been the result of protracted experiments.

Mr. WILLIAM ENGLAND then read a paper *On Dry Plate Processes.* This communication also will appear in our next number.

Mr. SPILLER, alluding to one process recommended in the paper, inquired what end was served by drying the plate after the application of the beer and previous to that of the solution of pyrogallic acid.

Mr. ENGLAND replied that it gave the film greater hardness. It was also better to apply the pyrogallic acid solution by itself after the drying of the film, as greater sensitiveness, with more detail, was obtained. With respect to sensitiveness, the process gave plates which were about one-fifth slower than wet collodion.

Mr. WILLIAM WAINWRIGHT, Jun., exhibited a negative taken on a gelatino-bromide plate with an exposure of six seconds, a small stop being employed in the lens.

Mr. T. SEBASTIAN DAVIS, after a few remarks, read a paper in which he gave full details of a dry process that was highly successful.

For this paper and that of Mr. England the Chairman returned thanks to the respective authors.

The CHAIRMAN then announced that there would be an annual exhibition as usual; it would be opened in the beginning of October and closed on the 12th of November. The Council had decided that medals would be awarded for the best productions. Full particulars regarding this would appear in due time. He (the Chairman) also announced that at the next meeting, to be held on June 11th, important communications would be made by Mr. J. R. Johnson *(On Alizarine)*, Mr. Bolas *(On Gelatine)*, Mr. Warnerke *(On the Phenomenon of Blurring)*, and by Mr. Sarony *(On Pigment Printing)*.

The proceedings then terminated.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE last meeting before the usual summer recess was held at the Memorial Hall, on Thursday evening, the 9th inst.,—Mr. A. Brothers, F.R.A.S., President, in the chair.

The minutes having been disposed of,

The PRESIDENT said it was in contemplation to have an exhibition of photographs in conjunction with the coming exhibition of paintings, &c., at Peel Park, in August next, and requested contributions from the members of the Society.

The Secretary laid the *Bulletins* of the Belgian Photographic Society on the table.

Mr. Lund showed some prints on Durand's paper, printed by himself (Mr. Lund) in December last, and toned on the 5th May. The tones were satisfactory.

Mr. W. J. Chadwick exhibited a pair of lanterns of new design, one feature of which was that they had no chimney. He (Mr. Chadwick) also exhibited a new oxygen retort. [Mr. Chadwick has forwarded to us two short communications on these subjects, which will be found on another page.]

The meeting, which was well attended for the season, was then adjourned.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

AN ordinary meeting of this Society was held on the 15th March,—Dr. Vogel presiding as usual.

Herr Schmidt, of Kiel, sent a carbon print, the greater part of which was covered with white lustrous flecks, which appeared to be particles of paper that had dissolved off from the transfer paper in the course of the second transfer.

Herr SCHAARWÄCHTER said he had observed the same fault, though not very often, and had remarked that it occurred when too long a time was allowed to elapse between the sensitising of the paper and its development.

The CHAIRMAN observed that he experimented with the paper Herr Schmidt had sent along with the pictures, and had got faultless results.

A letter was then read from Herr Siegson, of Ribinsk, Russia, on reversing negatives. The contents of this letter rather surprised those who heard it read, as they were not accustomed to think of varnished negatives being so easily drawn off, and had, consequently, confined their experiments to the drawing off of unvarnished plates.

The CHAIRMAN remarked that he had had difficulty sometimes in drawing off even unvarnished negatives, with leather collodion and caoutchouc, as the negative would not always come off quite free. He then added a little sulphuric acid to the water in which the plates were laid, after which all went well. Unfortunately plates intensified with lead and potassic chromate could not be treated with sulphuric acid, as the lead and chromium compound would thereby be decomposed.

Herr HARNECKER, of Wriezen, showed some of his excellent enlargements, and remarked that he supposed those present were all aware that such enlargements were produced by development. They were obtained by artificial lights, the most powerful of which was the electric light. But, in common with Dr. Vogel, he had experimented with electric light, and found that its chemical action was not so great as would have been expected from its great intensity; still, with a little care, one could regulate the length of the exposure. He was just having a rotating electric machine, driven by a steam engine, fitted up, and he hoped by its means to produce pictures measuring six metres by five metres. He had already produced one print, life size, from a portrait of the Emperor of Austria on horseback. This picture was taken upon shirting, and was intended to be painted over in oils. He (Herr Harnecker) then showed a half-length portrait on shirting, which was but little behind a similar picture on paper.

Herr Obernetter had sent some coloured lichtdrucks of a large size produced by his new process, and made a communication to the effect that fog could be removed from his new reversed negative dry plates by slightly acidulating the iodide and bromide baths.

The CHAIRMAN said he had prepared some good dry plates in the way described by Herr Obernetter. It did not seem to be very difficult to work with emulsions, and the work produced could be relied upon; but the work of producing the emulsion itself was somewhat ticklish and uncertain in its results.

Herr HARNECKER added that he had experimentally prepared some paper in the way Herr Obernetter prepared his plates—that is, he had first silvered and then iodised it; but he had not found paper so prepared suitable for his purposes. The silver had to be kept very acid, and thus became not very sensitive, while sensitiveness was required by his process.

The CHAIRMAN then made some interesting experiments with collodion cotton, to show that it was not so combustible a substance as it was generally assumed to be. First he set fire to a quantity of collodion cotton, which burned quickly but not explosively. He then struck another quantity of the cotton repeatedly and sharply with a hammer without its showing any tendency to explode. Lastly: he moistened a quantity of collodion cotton with alcohol, and set it on fire, when it burned like ordinary alcohol, only that the flame was somewhat yellower than usual—an appearance which a spectroscopic examination showed to be caused by the calcium contained in the cotton. When the greater part of the alcohol was consumed the cotton in the corners began to carbonise, and was thus consumed without explosion. These phenomena, he (Dr. Vogel) said, led him to the following conclusions:—1. That it is not possible to set common collodion cotton on fire by a knock or a blow.—2. That collodion cotton moistened with alcohol does not explode on ignition, and that in this condition it is not more combustible than alcohol alone.—3. That even dry collodion cotton, supposing it to be ignited, is not so explosive as to make it likely to cause fire in ordinary circumstances.—The unlikelihood of spontaneous combustion was not so easily demonstrated by experiment; but, so far as he (the Chairman) was aware, no single case of the spontaneous combustion of collodion cotton had been properly authenticated. He hoped, by impressing those conclusions on the authorities, the rigorous prohibition of the transmission of collodion cotton would in time be relaxed.

The meeting was shortly after adjourned.

Correspondence.

EBURNEUMS.

To the EDITORS.

GENTLEMEN,—In your issue of last week, in the article on *Recent Improvements in Carbon Printing*, you allude to the eburneum process of the late Mr. John Burgess in these terms:—

"But owing to the heavy smudginess of the tones and the silver basis few cared to adopt this process in everyday practice."

The blackness of the tone was always somewhat of an objection to my late partner, Mr. Burgess, and at a very early date of carbon printing he adopted it for the eburneum process, but subsequently gave it up owing to the difficulty of getting satisfactory vignettes (as this class of picture formed the bulk of his business), and also from the fact of carbon prints being limited in size by that of the negative, whereas by the camera process any amount of reduction or enlargement is readily obtained with satisfactory definition.

As to the tone: when well done the colour produced by gold is generally liked by my customers; and smudginess, hardness, or excessive coldness of tone are due either to a defective negative or want of skill in the manipulation.

I believe the reason the process was not more generally adopted by the profession was owing to the difficulties which beset it. It needs a rather long experience to produce the exact class of transparency required, and great care is necessary in all the stages of the merely mechanical part, from the varnishing to the final drying; and though to produce one or two is really easy enough, to work it on a commercial scale requires a well-appointed place, experience, and a great amount of thoughtful care.

After an experience of fifteen years I venture to pronounce the eburneum pictures permanent, never having met with a single case of fading in any form. There is not the slightest difficulty in producing eburneums in carbon with or without collodion, and about thirteen years ago Mr. Burgess produced some very clever double-printed eburneums in carbon, introducing fancy margins, lines, &c.

I enclose a few of my *carte* eburneums, and I think you will admit that they are neither smudgy nor hard.—I am, yours, &c.,

Queen-Street, Norwich, May 13, 1878. H. C. Jennings.

[The proofs enclosed are *exceedingly* fine, being much superior to the original productions which elicited the comments we made last week.—Eds.]

GELATINO-BROMIDE.

To the Editors.

Genllemen,—I am desirous of preparing some plates in accordance with the plan described recently by Mr. C. Bennett in your Journal of March 29th, but am deterred at the outset by certain questions arising.

In the first place, Mr. Bennett says:—"Weigh out for a ten-ounce emulsion—

Bromide of ammonium	7 grains.
Best nitrate of silver	11 ,,
Gelatine	20 ,,
Distilled water	1 ounce."

Judging from the quantities given I suppose these must be multiplied by ten.

In the next place, as to coating the plates: must a thick pool be poured on them and left? or should they be tilted and drained like collodion? or should any definite quantity, and if so how much, be used for a plate of any given size?

Finally: should the plates be kept level, and the gelatine liquid until dry? or should the gelatine be allowed to set and then the plates might dry upright? or will either plan answer?

Information will much oblige, yours, &c., D.

Regent-street, London, May 15, 1878.

[Perhaps Mr. Bennett will kindly reply to this correspondent.—Eds.]

VERTICAL AND HORIZONTAL LINES.

To the Editors.

Gentlemen,—By way of sequel to my previous letter, I propose to offer one or two practical considerations arising from what I may now take, I hope, as proved in them, as to the apparent non-parallelism of all lines of considerable length in nature.

It has been suggested to me that I might devote a few words to meeting the common objections to the position I have been attempting to establish. But, in the meantime at least, I prefer to leave the question standing on the simple ground that the top of a high tower must be further from a spectator's eye than the bottom; and, if so, then the breadth of one side of the tower at the top must appear smaller than that of the same side at the bottom. This is only another way of saying that the vertical lines bounding the sides of the tower are not parallel, but seem to slope towards each other by a very small but appreciable amount of inclination.

But in proving that this must be so I am far from offering an excuse for the careless or ill-informed photographer and his tumbling towers and vistas of buildings running off into nothing. He ought to level his camera and use his rising-front; or, if he must tilt his camera a trifle, adjust his swing-back to compensate for it. Nothing should be attempted beyond what his optical means can reach, or nearly reach, without inclining his apparatus.

There may be circumstances—as in many old European cities, their narrow streets and market-places—which defy the shortest-focus lenses of our first makers to do their work without some distortion; but, even so, if the negative must exhibit sloping lines when they ought to be upright, the blemish should be corrected, by means well known to the skilled copyist, before a print or a lantern slide is taken. The public, in short, are getting educated on this point—to discriminate between good and inferior workmanship. People will not buy pictures of architectural subjects in a state suggestive of a violent earthquake and the instant crumbling of "cloud-capped towers and stately palaces."

Photographers are not infrequently glad to get access to a window on the first or second floor of a house, and so improve their position. In extreme cases the thing may be tried; but the height sought ought not to exceed the *entresol*, or at most the first floor. And why? One reason is that the lines below the level of the camera are thrown into violent perspective and resemble nothing seen in actual existence. But that is not the only reason. By mounting high above the street the diminution of horizontal lines by distance *takes effect at the bottom as well as at the top of the house* or other object to be copied. Suppose I want to copy a building across a street forty feet wide, and I mount to a window opposite to it thirty feet from the ground, the calculation I employed in my former letter shows me that my eye is now fifty feet from the bottom of the building I want to copy; the base line of it is, therefore, one-fourth part shorter than the corresponding line on a level with my eye. And this tapering is, of course, repeated upwards as well as downwards, so that the swing-back cannot be put in requisition for the double correction; if you apply it to compensate for one you double the amount of the other. It is well that a photographer who aims at irreproachable workmanship should know when he ought to yield to circumstances; and if his only means of accomplishing something he desires is to be attained by mounting to the top of a house, he would be wiser to forego the impracticable and turn his forces to better account elsewhere.—I am, yours, &c., James Stothert.

Clapham, May 10, 1878.

Bigamy: Sentence.—In continuance of the case which was reported in our issue of the 26th ult., Richard David Turnbull, 32, artist, was indicted, before the Common Serjeant, at the Central Criminal Court, on the 9th inst., for feloniously marrying Eliza Mary Dore, his wife being alive. Mr. Straight and Mr. Tamplin prosecuted, and the prisoner was defended by Mr. Kelly. The evidence went to show that the prisoner was first married in the year 1865, and that the woman he then married was still alive. It was clearly established that the prisoner subsequently went through the ceremony of marriage with at least two other women. The jury found the prisoner *Guilty*, and it was proved that he had been convicted of larceny and sentenced to eighteen months' hard labour. Mr. Straight informed the Court that the prisoner's career had been a very bad one. He was originally convicted of robbing his master, and after he obtained his liberty he went through the ceremony of marriage with several young women, and complaints had been made against him by a number of others, who stated that the prisoner, finding that he could not succeed in seducing them, had at length induced them to go through the ceremony of marriage with him, although he was perfectly well aware that his real wife was alive at the time, and that he had been married to several other women. The prisoner was sentenced to twelve months' hard labour.

Curious Case: Dust *v.* Kent.—This suit was heard on the equity side of the Lord Mayor's court, the judge, Sir T. Chambers, Q.C., taking it without the aid of a jury. The whole question at issue rested upon the construction of certain leases and agreements which had been entered into between the different occupiers of the premises for many years. The plaintiff carries on business under the name of D. B. James and Co., as general photographer, and occupies premises in Cannon-street, at the corner of Dowgate-hill. The entrance door to the photographic studio is at the corner of the building, and opens into a lobby, from which there is a staircase leading to the plaintiff's place of business. At one time those and the adjoining premises, where the defendant was in business as a hosier, were part and parcel, but in course of time they became separate under different lessors. On the right-hand side of the entrance lobby there was a doorway, which for some years had been used by the occupiers of the premises in question whereon to hang specimens of their photographs, &c. In cross-examination by Mr. Hilbury, who was instructed by Messrs. Curtis and Bates for the defendant, the plaintiff, who was asked whether he could seriously contend that the fact of the glass window being placed in the door had injured his business, said Yes; and to a greater extent than for the sum claimed in the present action, which was £800.—Mr. Hilbury: Why?—The plaintiff said that because the defendant was in the habit of displaying coats, braces, and articles of that description, and ladies who were accustomed to visit his place would not like to be confronted with the vision of such things as these. (A laugh.)—The learned Judge observed that it was feasible enough that many ladies who took a fancy in visiting the establishments of photographers would not altogether desire to be placed *vis-a-vis* with a number of young hosiers, whom they must see when this door was open. (A laugh.) He asked the plaintiff whether that was correct or not, and whether ladies under those circumstances did not court seclusion and privacy as far as it could be reasonably obtained.—The plaintiff said, as a rule, that was so.—Mr. Wildy Wright, who was instructed by Mr. Norton, represented the plaintiff.—In the result, the parties agreed to leave it to the Court to say what should be reasonable between them, the defendant offeiing to concede to the plaintiff the right to hang his pictures below the level of an opaque glass window in the door, and to further permit him to exhibit a small case of photographs under his (the defendant's) show-case, the result desired to be effected by the compromise being that the defendant should still have the advantage of light through the door into his shop without interfering with any of the advantages which the plaintiff had hitherto enjoyed.—The learned Judge therefore said he should take time before giving his formal decision.

EXCHANGE COLUMN.

Wanted to exchange, a musical box, playing six tunes, for a Dallmeyer's No. 1B lens.—Address, J. Cooper, 49, Clopton-street, Hulme, Manchester.

A Ross's quarter-plate portrait lens, and shifting back camera for two *cartes* on half-plates, will be exchanged for doublet by any good maker.—Address, W., 46, Haverstock-hill, London.

Wanted to exchange, a Voigtländer extra rapid B. *carte* lens, with stops, in good condition, for a whole-plate bellows camera, or $8\frac{1}{2} \times 6\frac{3}{4}$ medium-angle doublet by Ross.—Address, G. Fear, 36, Fore-street, Trowbridge.

ANSWERS TO CORRESPONDENTS.

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

A. Burns.—Received.

XXX.—Try E. Mander, Birmingham.

W. H. D. (Edinburgh).—The specification will be obtained and forwarded.

S. Bamforth.—We have never tried tin for the purpose; wood answers very well.

L. Hart (Sydney).—The Journals required have been out of print for several years.

R. L. A.—You may depend upon receiving any assistance we can give in such a good cause.

F. Daking.—The method proposed will answer quite well, and will repay the trouble and expense.

Flux.—All will be right if you add carbonate of potash with a little borax, and apply a stronger heat.

W. Harrison (Paris).—Our correspondent's MS. only reached us when the Journal was "made up" for press.

Leo.—The patent for the Scotellari cap has expired. The protection was confined to the six months provisionally granted.

A Stalker.—Make, first of all, a saturated solution of bichromate of potash, and then dilute any portion of this with one-third of its bulk of water.

A. N. B.—Make use of a collodion yielding a transparency in which the whites shall be entirely free from fog. The collodion you now employ does not appear to be suitable.

Old Sub.—The spots are undoubtedly the result of air-bubbles in the albumen, which ought to have been filtered through loosely-matted felt before being applied to the surface of the plate.

Redlander.—Desiccated albumen if dissolved in water containing a trace of ammonia will answer quite as well as fresh albumen for the purpose mentioned. The best strength will be four grains of albumen to an ounce of water.

D. W.—Yes, we are aware that there is such a trade as a manufacturer of brasswork, racks, &c., for cameras; but we are unable to afford further information concerning it. Any of the fittings may be obtained from camera-makers.

N. A. P.—No directory of photographers has ever been compiled; certainly no such compilation has ever been published. To issue such a work would entail a loss of too serious a nature to warrant any publisher undertaking the task.

Carbon Points.—There is no reason why you or any one else may not employ the electric light in portraiture. The patent granted in connection with the subject was not for this application of the light, but for a lamp of a peculiar construction.

A. E. Kralc.—We have some recollection of having noticed such a work being advertised; but not having seen it we are, consequently, totally ignorant of its merits or demerits. Of the various cheap manuals that by Mr. Jabez Hughes is probably the most comprehensive.

F. C. M.—Although not so well adapted for the purpose as a properly-constructed landscape lens, the front lens of a portrait combination will be suitable for producing landscapes of great excellence, provided an angle of view of too great width is not attempted to be included.

Lieut. J. D. Lysaght.—This gentleman favours us with some specimens of rapid work by gelatine plates, prepared according to the formula given by him in our Almanac for the present year (see page 93 of that work.) These specimens bear internal evidence of the great rapidity, indeed, of the exposure.

W. S. Alcock.—So much depends upon the manner in which the enlargement is to be finished that without knowing this it would be impossible to offer advice. It is probable, however, that a very rough drawing-paper will answer, so far as your purpose can be divined from your very vague communication.

J. Wilson.—The transparency is as good as could be expected under the circumstances. We have returned it as directed. The whites may be rendered quite clear by the application of a solution of cyanide of potassium in which has been dissolved a small quantity of iodine. This must be used with great judgment, as it acts most powerfully upon the picture.

S. Fry (Surbiton).—Our correspondent, in a note, says that the "Peripatetic Photographer" is wrong in saying that he (Mr. Fry) is going to give up carbon, for he intends to use both carbon and silver daily for such class of work as he thinks them suited to; and that what he really did say at the meeting in question wasthat he did not purpose to issue at present *cartes* and cabinets in carbon.

F.R.S.—Your five-inch astronomical telescope will answer exceedingly well for lunar photography. It will, however, be requisite to ascertain the precise amount of difference between its visual and chemical foci, for all such objectives are over-corrected to a slight extent. A few trials (which may be made during the day, and on a terrestrial subject) will enable you to determine the difference. It may be worth while to separate the two lenses comprising the objective, employing for that purpose a very uniformly-constructed ring of metal; but this is accompanied by some risk, and will not, we think, prove quite so good a method as that which we have already suggested.

Caledon.—The copyright, if such really do exist at all, is in the photograph, and not in the view itself. You may go to the very same spot from which the picture was obtained, provided a good reason exists for doing so, and take any required number of negatives, with lenses of any desired focus, and upon plates of any dimensions, without incurring the slightest risk of the "dread vengeance of the law." In brief, you must take a negative from nature yourself, and not copy that which has been taken by your rival.

M. R. S.—The want of sharpness in the *carte* may be due to a variety of causes. The lens may be so bad as not to produce a sharp image; or it may be good but the focussing imperfectly done. Again: the lens may be good and the focussing all that can be desired, but the ground glass and the sensitive plate may not occupy precisely the same planes. Bear this in mind: the larger the aperture of the lens with which you are working compared with its focus the more necessity there exists for securing absolute identity between the focussing-screen and the plate. There being no depth of definition, the manipulation is rendered more delicate and "touchy." We know a successful photographer who failed to obtain sharp pictures when using a large "baby lens," solely because the spring in the back of the dark slide was too strong and caused the thin holder to bend.

Instantaneous Photography.—We are favoured by Mr. Charles Bennett with a negative—accompanied by a transparency and a print taken from it—the peculiarity of which is so well described by Mr. Bennett that we make no apology for giving a copious extract from a note enclosed with the above:—"The photograph represents water being poured from a jug on to a group of flowers, the exposure being reduced to that excessive minimum by a mechanical arrangement that it delineates the drops of broken fluid in the act of descending. A magnifying glass applied to the negative places this fact beyond a doubt. The light was not good, the sun being quite clouded; but it being about noon the time was very much in favour of the operation. Upon consideration it must strike the most inexperienced that the difficulty of photographing a moving object so close to the camera—say eighteen feet—is much greater than that of an object further off—say, for instance, people walking, or a stormy sea—as it is obvious that the former will pass across the surface of the plate in the camera *much* quicker than in either of the two latter instances, in addition to the light being *very* much weaker in proportion as the object is brought nearer to the camera. I should like you to examine it to see whether you think that a wet collodion plate under any circumstances could be made to produce the same result; or, better, taking into consideration the rendering of the weaker gradations of light which I have endeavoured to bring out in this negative from the deeper shadows of the hall seen in the rear of the subject. I am told by an adept in the wet process that the same result is *quite* possible with bath and collodion specially prepared, and I do not say 'nay.' In my own hands, however, a good many years back, when I occupied myself solely with wet plates and succeeded in getting very fair instantaneous views of waves and shipping, I failed with a subject similar to the one I have now been attempting; but it by no means follows that others more skilful in the old process should not surpass it entirely. I simply send the negative to you to give your opinion on the matter."——The negative is fully exposed, and an application of a magnifying glass shows very plainly the drops of water trickling down upon the flowers from a jug held on high by the lady whose portrait is taken in this unusual position. The picture is a great triumph for dry-plate photography.

The Queen and Photography.—Mr. M'Lachlan had the honour of submitting to Her Majesty's inspection on Friday last, at Buckingham Palace, the large picture painted by him, from photographs taken purposely and from life, representing the Queen and the Royal Family at Windsor.

Photography from a Paddle-box.—Writing to us, from Sydney, Mr. B. J. Edwards has enclosed a print from a quarter-plate negative taken under circumstances of an unusual kind. He says:—"It is on an emulsion plate prepared last November in England. The plate was kept in the dark slide through the tropics and knocked about in the cabin a good deal during the voyage out, so that I hardly expected any result. The exposure was made from the paddle-box of a small coasting steamer in a very rough sea. I cannot guess the time, but it could not have been more than a quarter of a second, the motion of the vessel being very great and the speed at the time about nine miles an hour." Mr. Edwards adds:—"I find photography flourishing in these colonies, especially in Sydney. I hope to visit Tasmania, New Zealand, and return in the autumn, *via* Fiji, Honolulu, and San Francisco. I hope to get some negatives on the way, but my crippled foot has prevented my doing much work at present." The subject depicted in the photograph is a bold, rocky headland some distance off (the sea intervening), yet sufficiently sharp to enable us to see its general features.

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THE BRITISH

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No. 942. Vol. XXV.—MAY 24, 1878.

ON THE COMPARATIVE DENSITY OF DRY-PLATE FILMS.

Considerable variety of opinion exists in different quarters as to whether the best results are obtainable upon thick or thin films, each class finding numerous supporters ready to uphold the superiority of their respective favourites. Though latterly the weight of opinion has tended in the direction of a dense, creamy coating, there are still many who retain a liking for the clear, transparent films so closely identified with the ancient tannin and other processes now almost passed out of use, and notably with the "rapid" plates formerly issued by Dr. Hill Norris. Recent alterations and improvements in the conditions attending the preparation and use of dry plates have, no doubt, done much to establish a new series of requirements in this direction; but still sufficient similarity remains between the processes of today and a dozen years ago to render the subject worthy of a passing notice.

A kindred subject—the fineness of division of the silver bromide in emulsions—was discussed in these columns a few months ago; and, though no absolute rule was established, the general opinion was expressed that fineness of division (which was held to be tantamount to transparency of the film) leads to density of image, while a coarse formation of the bromide (giving an opaque film) is conducive to sensitiveness.

If we accept this as a broad rule—we by no means accept it unconditionally—it still leaves our present subject open to a good deal of further discussion. It does not touch at all upon plates prepared by means of the bath; and, even confining ourselves to emulsion films, it is obvious that the density—or *apparent* density—may depend upon widely different causes, such as the physical state of the silver haloid, the proportion in which it is present in the emulsion, the manner in which the films are treated, and, lastly, the nature of the organifier (if any) which may be employed. All or any of these conditions are capable of producing a modification in the appearance of the film—indeed the same emulsion may be made by a very trivial alteration in the mode of treatment to yield films of widely different characters; hence we may consider the subject in its various aspects, and endeavour to trace the connection, if there be any, between the physical properties of the film previous to exposure and the results obtained.

Viewing the subject from a standpoint altogether independent of the mode by which the plates are prepared, we might reasonably expect to obtain certain special properties with each description of film. Thus a dense film would seem to offer the readiest means not only of producing a dense image, but also of rendering a wide range of half-tones. Its comparative opacity would also render it less liable to the defect of blurring, as by its power of arresting the whole or a greater portion of the rays falling upon it reflection from the back surface of the plate would be reduced to a minimum. A thin film, on the contrary, might be expected to yield a more delicate image, devoid of strong contrasts and, in point of actual density, inferior to one produced upon a film richer in sensitive matter. These results, however, are as often as not exactly reversed. We know that the thin, transparent tannin films were capable of yielding an unlimited degree of density, the general tendency, unless carefully treated, being towards harshness of contrast. On the other hand, some of the most opaque emulsion films we have yet seen have exhibited an almost complete incapacity to acquire density under any form of development or intensification.

Again: on the score of blurring, though tannin plates were peculiarly liable to the defect, the employment of a coloured backing, except under very trying circumstances, effectually cured it, whereas some of the denser descriptions of films are equally liable whether the backing be used or not. It may, certainly, be urged that the blurring is not of the same description on the two forms of plates; that is to say, it does not arise from the same cause—reflection from the back surface. With the dense film it is, probably, produced in the film itself by irradiation or reflection from the particles of silver bromide. On a broad view of the question, then, it does not appear that any real advantage attaches to either side, or, in other words, the bare fact of a film being dense or transparent when separated from other conditions has no effect upon the resulting image.

In connection with the comparative sensitiveness of thick and thin films various claims have been made in favour of the former. The late Mr. Sutton held that a dense bromide plate possessed greater sensitiveness than a more transparent one, simply by virtue of the greater quantity of sensitive material it contained. Without disputing the facts as regards the comparative sensitiveness, we are of opinion that Mr. Sutton's conclusions were based upon a misapprehension. If we fix the normal sensitiveness of silver bromide at a certain standard it is impossible to believe that that standard will be either raised or lowered by the mere alteration of the aggregate quantity of materials acted upon; that is to say, if the normal sensitiveness of a single atom of the haloid be fixed at 1, we cannot believe that the mere bringing together of two atoms will raise the sensitiveness to 1½ or 2 in the aggregate. The true explanation is, we think, easily found elsewhere. Mr. Sutton, it will be remembered, worked the bromide process with the bath, in which the employment of a strong silver solution—the chief condition requisite to the formation of a dense film—is also highly favourable to rapidity. Though Mr. Sutton used a highly-salted collodion the absolute sensitiveness of his films would not have been altered had the salting been reduced from twelve to eight grains per ounce, provided the same strength of bath were adhered to, and yet the films themselves would have been inferior in density.

The greater power of a dense film of absorbing the rays of light which pass into it is also stated to result in a higher degree of sensitiveness than, *cæteris paribus*, would be obtained with a transparent film capable of transmitting a large proportion of the rays. There appears to be considerably more reason in this claim than in the last mentioned, for the rays arrested in their passage through the film must of necessity produce a greater result than those which merely pass through without absorption. The effect in the case of a dense film is analogous to, if not identical with, the defect known as irradiation, differing from it only in degree. Thus, a ray of light striking upon the surface of a film capable of completely absorbing it may be supposed to suffer reflection from one to another of the minute particles forming the sensitive layer, until at length it loses itself, or becomes suppressed. It may be readily imagined that the repetition of this process, in which the whole of the actinic force is utilised by innumerable atoms simultaneously, must lead to an appearance of greater exposure than in the case of a semi-transparent film, which transmits a portion of the actinism and allows it to escape.

As a proof of the correctness of this view, it is a well-known fact that if one half of such a transparent plate be painted with a coloured "backing," that portion upon development will exhibit stronger contrasts than the remaining half, and will have the general appearance of having received a less exposure. Such, to a certain extent, is indeed the case, for it has been deprived of the auxiliary effect of that portion of the rays absorbed by the backing. It might be anticipated from what we have stated that the thin films would be less liable to lose delicacy in the half-lights from excessive exposure, and such in practice is generally found to be the case. Though with a proper exposure the finest results are obtainable with thick opaque films, and probably with less care than would be necessary in developing one of the thinner descriptions of film, it is an undoubted fact that a slight amount of over-exposure, which would, perhaps, not noticeably affect a thin film, renders the development of the thicker one an operation of the greatest delicacy, owing to the powerful tendency of the high and middle tints to thicken or become heavy. It is of importance that we distinguish between differences of density arising from the physical character of the film and from a mere alteration of the proportion of silver bromide present. In the latter instance the difference, if any, in the behaviour of the film under development can only take the form of a more or less vigorous deposit, the actual sensitiveness of the plate remaining the same. It may possibly be that with the denser film a given exposure will produce a printable negative when the other will not, owing to there being an insufficient body of matter capable of reduction by the developer. This, however, as we pointed out last week, is not a real difference in sensitiveness, though for practical purposes it may perhaps be considered as such.

We require a new term to more fully express the idea we wish to convey, namely, the distinction between actual and apparent sensitiveness. "Impressibility" has been proposed, and seems to answer the requirements; for, if two plates demand exactly equal exposures to "impress" a developable image, however faint, they may be said to be equal in *actual* sensitiveness. If one plate is capable with that exposure of being worked up to printing density, while the other is not, the first may be said to possess greater *apparent* or practical rapidity. It would be well, in speaking of the performances of dry plates with respect to exposure, if this distinction were always borne in mind, as the difference between "impressibility" and practical sensitiveness is often so great that considerable misapprehensions arise from the confusion of terms.

We shall speak next week of the various means by which the physical character of the films may be modified to suit the taste, and also of the properties exhibited by films so modified. The results obtained in this direction are quite remarkable—so much so that we are led to believe that the mechanical means adopted in the preparation of the film forms at least as important a factor in the final result as does the chemical formula.

CADETT'S PNEUMATIC SHUTTER.

It has been our privilege to describe at one time or another nearly every one of the numerous contrivances that have been invented or proposed for the purpose of facilitating what, after all, is the simplest operation in photography considered as a mere mechanical act, and yet which, as at present conducted, especially in relation to portraiture, is one of the clumsiest and most bungling of operations—we allude to the capping and uncapping of the lens so as to give the requisite exposure in the camera.

The proper method of uncapping a lens has, in the estimation of ignorant people, "something" in it which trenches on the stronghold of fine art itself. Probably the choicest instance of this that has been placed on record is the statement which appeared in the *Daily Telegraph* of a few years ago, to the effect that the great secret of the success attained by Mr. J. E. Mayall, of Brighton, consisted in the method of uncapping his lens, as he had discovered that the removal of the cap on the right or on the left, or from above or from below, caused the shadows on the face of the negative of the sitter to fall right or left, up or down, in accordance with the magic touch of the artist who uncovered the lens. Of course Mr. Mayall was held entirely free from the responsibility of having written such nonsense, or having so much as encouraged it—no photographer could possibly have done so; still, the fact that anyone on the literary staff of an important metropolitan newspaper could have written in such a strain proves that no small amount of ignorance on this subject has been, and perhaps is still, prevalent.

But to pass from the æsthetics to the mechanics of uncapping the lens: it must, we think, be considered as something not altogether in keeping with the refinement of art and the march of scientific methods that a photographer has to "stand by" his camera, and with his eyes fastened upon his sitter, so as to discover the moment when immobility has assumed its sway, ejaculate the stereotyped words, "Steady—please!" and then by a demonstrative action of the hand remove the cap. This action need not necessarily excite any unpleasant expression on the face of the sitter; but from the expression we have seen on numerous faces the result, pictorially, is not very far removed from that obtained by the photographer "Far West," whose formula when ready to expose is said to have consisted of the presentation of a pistol at the head of the sitter with a "daar to move a muscle and I'll blow yer brains out!" *Tempora mutantur!* "Monitors" supplant three-deckers; and finesse takes the place of brute force. So with scientific processes.

Pneumatics is not absolutely unknown in its application to the requirements of the photographer who may have invoked its aid in fixing a plate upon a holder or of whistling through a tube to arrest the ear of an assistant in a distant room; but up to the present period our readers were unaware of its having been pressed into the service of the lens cap for the purpose of exposing a view or any other subject.

One evening last week we received a visit from Mr. James Cadett, who explained that he had invented a new kind of shutter by means of which instantaneous or ordinary exposures could be made without the sitter being aware of it. Now from time to time we have been apprised at an early moment of numerous schemes by which the photographic world was to receive a great impetus in its career of advancement; yet still the measure of our conservatism has grown none the less. It was in this mood we received the new comer. The instrument was said "to supply a want long felt by the profession." All new inventions usually do this. The "parent" of the pneumatic shutter did not, however, waste his or our time by speaking about it; he merely produced the instrument and requested us to fix it to the lens of a camera. This was soon done. The front of the lens was thus covered by a flap of two thicknesses of velvet, and at a distance of twelve feet from the lens we were requested to pinch an india-rubber ball that was easily held in the hand, and which was attached to the lens by means of a tube. Simultaneously with every pinch of the ball the flap flew up, leaving the lens uncovered; when the pressure from the hand was relaxed the lens was covered as before. We request our readers' attention while we describe in what manner and by what agency this was done.

A small mahogany box, about two inches square, is placed on the top of the hood or sunshade of a portrait lens. By means of its peculiar configuration, and with the aid of an india-rubber band, it can be attached to lenses of any size. When thus attached the flat, black velvet disc which forms the shutter is connected with a rotating axis so arranged that by means of a spring the shutter or flap remains tightly pressed against the front of the lens hood. Projecting from one side of the mahogany box is a small bit of brass pipe, upon which is sprung the end of a piece of india-rubber tubing of any desired length—say twelve feet, which in practice has been found o be a sufficient length. The farther end of this piece of tubing erminates in an india-rubber ball of a pear-shaped form. The otating axis which we have described as controlling the flap or hutter is in turn operated upon by a lever which is connected with small bellows in the interior of the box, and the action is such hat when, by pinching the ball at the extremity of the flexible ubing the little bellows is filled with air and expands, it acts upon a ever by which the flap is suddenly raised up from the lens, and which hus becomes uncovered. So instantaneous is the action that concurrently with the pressure of the hand upon the ball up flies the shutter which covers the lens. The release of the pressure is attended by an immediate covering up of the lens.

For a long period we have not seen any application of mechanical science to the camera so ingenious as that now described. Its uses are manifold, especially in the direction of very rapid exposures. The photographer may leave the camera, and, having the ball in his hand, or in his pocket, may go up to and converse with his sitter, may speak to him with great earnestness on any topic of interest, and when he sees that a suitable expression has been elicited he may pinch the ball, keeping on the pressure for as many seconds as his client retains the necessary expression, when by relaxing the pressure all is over and the sitter is unaware of having been "taken." In the case of a baby or nervous individual who becomes timid and trembles when the hand of the photographer is seen to remove the cap what a boon this little invention must prove!

If, however, the apparatus be attached to the inner instead of the outer end of the lens, it will be doubly valuable, because, even though staring at the lens, a sitter will, in the former case, be entirely ignorant of the moment when the internal uncapping of the lens takes place; whereas, when fixed externally, the subject will, most likely, be aware of the act of exposure, although entirely ignorant of the magical means by which the exposure has been effected.

From the fact that Messrs. Marion and Co. have entered warmly into this invention as "distributors," we have no doubt that our readers will shortly become practically acquainted with this most ingenious invention, which enables the photographer to stand by the side of his sitter—whether an adult or a child—engaging the attention while the exposure is being effected.

STREET PHOTOGRAPHY.

By this term we refer to the photographing of views of the streets, and street architecture generally, of our cities and towns; and the present time being, *par excellence*, the best season in the whole year for this particular class of work, we call attention to a much neglected though most interesting branch of photography. There have been, of course, many views of streets in various places taken, especially in the palmy days of the stereoscope; but now one may search an exhibition through, or look over the album of many an enthusiastic photographer, without encountering a single example of street photography. No doubt the subjects are not such as would always sell, and their production is among the most difficult of matters; but we have yet to learn that the latter would deter photographers from attempting the task, to mention a difficulty being to so many of them to raise an army to conquer it.

Thanks to the commercial enterprise of many first-class workers in outdoor subjects we have records—that might be imperishable, but which, alas! too frequently are but written in sand—of the ruined castles, the churches, and countless numbers of stately mansions whose names tell history of noble houses, and which to future generations will be of the highest interest; that is, if permanent photography should take a proper hold, and enable photographers of the present day to produce works of enduring character such as befits the subject—if, in fact, they would be true to themselves. But of the commercial life of the nation—the warehouse of the manufacturers, the marts of the shopkeepers, the palatial offices of our limited companies, the growth of architecture in town buildings (the old, dying away, elbowed out of existence by the new), the quaint relics of old England still existing in corners and byways, day by day growing less and less in number—how many records are there? A few views of places of universal interest, a building known to everybody, and a few representations of some picturesque old spots—and that is about all; and yet we firmly believe that if any photographer in almost any town of the plainest brick and mortar type were to make a point of securing a set of a dozen or two views of the leading thoroughfares of his town linked with some of its more out-of-the-way places—characteristic if plain—he would find it commercially a success.

In time to come such sets would be of priceless value to the archæologist and the antiquarian. Could any of our readers imagine what would be the possible worth now of such a set of photographic views, if the thing were possible, of London, Liverpool, Manchester, and a score of other towns taken two hundred years ago? This view, however, appeals to the sentimental rather than to the utilitarian, as, nowadays, a plan is nothing if not paying to one (and that the largest) school. We lay most stress upon the pecuniarily profitable aspect of our recommendation.

The photographer who first attempts street architecture, particularly if he be a townsman, will be surprised at the difficulty he meets with in obtaining negatives free from fog; in fact, he will find it next to impossible to get clear shadows, and will be inclined to set it down to his chemicals rather than the true cause, which is the constant prevalence of a certain amount of smoke in the atmosphere of all towns. The great secret of obtaining good and clear negatives lies in the power of apprehending the full force of this fact, and of taking advantage of the very few occasions when this smoke-begot haze is at a minimum. To dwellers in towns it is so much a matter of use that it is difficult for them fully to comprehend how rare it is that their atmosphere is not smoke-laden.

A hint we once had from an eminent painter may be useful to them. Walking out in the country, a heavy thunder-cloud being overhead, one of the party, pointing to a heavy shadow in a deep cluster of trees, said he should think it ought to be represented in a picture by pure black paint. The artist laughed, and, raising his arm so as to shade his eyes, and allow the spot we were looking at to be seen underneath the black-looking shade his arm made, said—"Look at it this way." All followed suit, and the vast difference in colour shown between the dark underside of the coat sleeve and the object that was thought so black was most striking.

In like manner, let anyone who wishes to take a street view or even a single building in a street raise his arm and compare the shadows under the eaves (say) with those under the upraised arm, and he will soon be taught how next to impossible it is to get a clear atmosphere; and if he further remember that, owing to the minuteness of the particles constituting the haze causing them to throw off the smallest—that is, the most actinic—light wave atmospheric haze or fog is reproduced more strongly in a photograph than it appears to the eye, he will understand how rare an event it is to be able to obtain a first-class negative in this kind of work.

Not to damp the ardour of the would-be photographer in this branch, we would, however, observe that there are certain occasions when the difficulties are reduced to a minimum and atmospheric conditions place few difficulties in the way; and that, too, just at the time when the landscape man is compelled to stay at home—we mean during the time that high winds prevail. Fortunately brick, mortar, or stone buildings do not sway with the wind whenever it blows hard, and still, more especially after rain, the air is so cleared of its fog-producing particles that almost perfect negatives may be obtained.

At the beginning of our article we alluded to the fact of the present season being the best time of the year. We have plenty both of wind and rain, and we have noticed for so long as a couple of days together that all conditions have been most favourable for this kind of work. Later in the year, when the surface of the earth is heated to a greater depth, the air is heated so rapidly after rain and wind that dust and smoke reign supreme for far longer pericds than they do in the earlier period of the year, and the favourable intervals for street work are fewer and farther between.

It is, perhaps, not necessary to state that early in the morning the air is clearest; but it will be found that in most towns after half-past five the smoke begins to rise from the chimneys for the preparation of the workman's matutinal meal, and then if the wind be wrong there need be no attempt at photography. Again: such views as we speak of are of little interest if the shops are all closed, as they are at such an early hour. There is often a lull in chimney smoke from about ten to eleven o'clock, and this is a highly favourable time.

As to the mechanical means little need be said. A quick lens is a *sine quâ non;* but, as there are now so many quick lenses made capable of giving straight lines in architectural subjects, we need do no more than mention them. Views of the kind we are dwelling upon, to be perfect, should include figures, and if a camera be stationed at an upper window a picture can generally be taken without attracting observation, and so causing the figures to look at the spectator. If the necessary standpoint be in the street itself the difficulties are increased tenfold, so that no one but the most patient of men should attempt the work. The various expedients of dodging the crowds have been too frequently described to need further expatiating upon. The chemicals, bath, collodion, &c., should be in perfect order, but the usual dark-room arrangements need not be in the slightest degree altered. A plate sent from the dark room in the middle of portrait work, and well backed up with wet paper, ought to bear being sent out to the operator with the camera, and be good for developing half or three-quarters of an hour afterwards.

Where for any special purpose great delicacy of detail is required, a small stop is necessary then, of course, instantaneous exposures are impossible, and the best plan is to expose and let the pedestrians pass by. They will scarcely perceptibly show in the picture, though if a white-bloused workman should come within the field of view it would be well to cap the lens till he had gone by. We now leave the subject in our readers' hands.

While we cannot avoid expressing our admiration of the manner in which Mr. Warnerke has dealt with the subject of halation or blurring of the image, in the paper he read before the Photographic Society of France, and which will be found in another page, we must here, as we have done before in Mr. Warnerke's presence, take exception to the definiteness of the proof supporting his theory said by him to be afforded by the experiment with the prism of optical glass. Our reason for this is to be found in the fact that by covering what we shall designate the first surface of the prism with emulsion the conditions under which the light enters are quite changed from those which would exist were no such emulsified film present. In the latter case a ray of light falling upon the surface of the prism would pass straight on until it reached the oblique face, by which it would be reflected in another direction; but in the former case a phenomenon of a different kind takes place, the nature of which we here shortly state:—If a ray of sunlight fall upon a plate of polished glass it is transmitted *as a ray;* but if a plate of ground glass be substituted for that which is polished, the whole surface, if examined from behind, is found to be rendered luminous and the ray is arrested. The light, instead of being transmitted as a ray and in a straight line, is radiated from every portion of the ground surface, and in every direction. As with ground glass so with a pellicle of collodio-bromide of silver. Every atom of bromide of silver in the film becomes, when a ray of light falls upon it, a radiant, which arrests the direct transmission of the ray and distributes it in every direction. For this reason the ray d in Mr. Warnerke's second diagram cannot proceed in a straight line to c, but becomes broken up at the film of emulsion and is then distributed all over the surface b, c, and even over the emergent face of the prism, which we shall assume to be one of a rectangul form, although not correctly engraved as such. These surfac in turn, act the part of reflectors of the radiated light, by whi the back of the film is illuminated to such an extent as to produ fog. This also explains why a plate backed even with red orange will only diminish, not cure, halation; for, as it is we known, bromide of silver is sensitive even to feeble red and orang rays. Notwithstanding what we have said Mr. Warnerke's pap is one possessing exceptional value.

PHOTOGRAPHY AT THE LEAST REFRANGIBLE ENI OF THE SPECTRUM, AND ON SOME PHOTOGRAPHIC PHENOMENA.

[A communication to the Photographic Society of Great Britain.]

There are two subjects connected with the progress of photography that I wish to bring before the meeting this evening. It will be in the recollection of the Society that some time ago I exhibited photographs of the least refrangible end of the spectrum—that is, of the red end, and of those dark rays which lie beyond it, and which are usually called the dark heat rays. After four years' research I have now worked out a process that has almost exceeded my expectation, and allows me to obtain negatives of the spectrum which show the detail of these parts better than any I had hitherto employed. Any one who has used a prismatic spectrum will be aware that the least refrangible end is very much compressed, and that the possibility of getting good definition beyond the red end of the spectrum is almost hopeless, owing to the rapid change in focus of the different rays.

The following table will give you an idea of the way in which the red end is compressed. It is taken from Watts' *Index of Spectra*, and, in considering it, it must be remembered that B is the last line of the spectrum which is easily visible:—

	Dispersion. Crown Glass.	Dispersion. Flint Glass.	Carbon Disulphide.	Diffraction.
B (Red)	0	0	0	0
D (Orange)	236	220	194	381
E (Green)	451	434	400	624
F (Blue)	644	626	590	784
G (Indigo)	1,000	1,000	1,000	1,000

It will thus be seen that in flint glass, which is usually employed for simple prisms, F to G occupies 374 parts of the whole, whilst, with the diffraction grating, it occupies only 216 parts. Again: with the former, D to B occupies 236, and in the latter 381. Of course, the lower down in the spectrum you go the more compressed will be the wave lengths. Now, I have been thus particular in pointing this out, as I have used a diffraction grating instead of prisms for the photographs on which I set most store. I have had placed at my disposal two gratings by Rutherfurd, of New York—one containing 17,280 lines at equal intervals apart to the inch, and the other 8,620 lines to the inch. The former is a beautiful piece of workmanship, silvered at the back; the latter is in speculum metal, not quite so brilliant, but gives such spectra as can hardly be equalled. I need scarcely go into the difference in the spectra of the gratings and of the prism. The one is formed by the interference of coloured rays, the latter by the difference in refractive indices of the various rays. When we throw a beam of light on the grating, if it be a reflection grating (as those are which I am using), and allow the reflected beam to fall on a white surface, we get first a central patch of white light, then at each side of the white patch is a spectrum, commencing with the violet and ending with the red rays. Beyond these pair of spectra are others extending indefinitely outwards, but running into one another till we get a dirty white band formed. I wish you to note this, as we shall see that in some operations (unless precautions be taken) this mixture of spectra is an evil. From theoretical considerations we are told that the white light dispersed in the first pair of spectra on each side of the white patch cannot be more than one-fifth of the quantity of the original beam falling on the grating. It cannot, therefore, be more than one-tenth in one of the pair. Theoretically, also, we find that the white light available for the second pair of spectra is only one-fourth that of the first. Now this would be a serious loss of light; but, when we consider that the second order of the spectrum is spread over twice as much length as the first, the real intensity of any ray is really one-eighth of that of the same ray of the first order, and only $\frac{1}{80}$th of the amount of that found in the incident beam. Similarly, the intensity for the third order is really only $\frac{1}{27}$th that of the full order, or $\frac{1}{270}$ of that of the incident beam. We next have to consider the difference made by the number of lines ruled on the grating. The two I have been employing ill furnish a very good example of what I wish to demonstrate. In the ·ating with 8,640 lines to the inch, the *second* order has the same spersion as that of the *first* order of the 17,280 lines to the inch. he respective brightness of the *white* light available in each for [ual dispersion would be $\frac{1}{40}$ and $\frac{1}{10}$, as before shown—that is, of ›urse, supposing the incident beam to be of the same intensity in ıch case; the dispersion being the same, this would indicate that, r photographic purposes, the first order of the closer-ruled spectrum better to use to shorten exposure than the second of that wider ıled. Further: the first order of the latter grating spectra will only › twice as bright in the first order of the former, since it is only spersed to half the length. In other words, the brightness of any ·der of spectrum varies *inversely* as the cube of the order of the ›ectrum employed, and *directly* as the number of lines in a given :eadth of the grating. It is, therefore, better to employ a lower order spectrum with a closely-ruled grating than a high order with a more idely-ruled grating, remembering that the resolving power, as it is ılled, is the same in both, but the light in the former is much more tense than with the latter.

Now, since my purpose of introducing the subject at all was with a ew of showing its adaptation to photography, I must touch on the ngth of camera which it is best to employ. I must first show you the ·rangement adopted for employment with the grating. We have a ›llimator carrying a slit at one end of a tube, and at the other a ns, to render the rays parallel. Then we place the grating so that the it of the light coming from the sun and reflected by a heliostat, after assing through the slit, falls centrally on the grating. The white patch f the reflected beam is made to clear the collimator, and the camera ith its lens is so placed as to receive the order of the spectrum it may e desired to work with. The effect of lengthening the focus of the ımera lens is to enlarge the area of the spectrum. It, therefore, aries in brightness inversely as the square of the length of the focus. uppose, then, we had to choose between a camera lens of four feet ›cus and one of two feet focus, we must recollect that the image ith the former would only be a quarter as bright as that taken with ıe latter. In choosing a camera for these purposes, a reference ıust be made to the focal length of the collimating lens. That hich I use is twenty inches, and I find that for my work I get etter definition when the focal length of the camera lens is about ıe same; for, be it remembered, that when the two lenses are of equal ›ci the slit and its image will be of the same dimensions. If I used six-foot camera I should prefer to use a six-foot collimator.

Having now cleared the ground, so to speak, I will show you what grating can do. This negative which I hold in my hand is a pho›graph of the spectrum from B to A, the latter line being the ordinary mit of visibility of the spectrum. There are between them 130 per›ctly-defined lines, and, in fact, contains more lines than is shown by ›rofessor Smyth's map of the same region as mapped by visual obser·ation. It was taken with the first order of the closer-ruled grating. The next negative is taken with the first order of the smaller-ruled ·rating, and contains about seventy lines which lie on the dark side f A. Many of these have never been seen by the eye, even by the id of fluorescence. This next photograph is one which is taken with the same camera and lens, but with three prisms. The last ›paque band lies far in the ultra red, and is composed in reality of hose lines which are so beautifully separated in the grating photo›raph. It will be apparent how tremendously compressed the ›rismatic spectrum is when it reaches these great wave lengths.

Here are two negatives of E to C—one taken with the three prisms and the other with the grating. In this case you will note that the ›risms have the advantage over the grating; in other words, for the violet end prisms may advantageously be employed, but for the red he grating is preferable. The line furthest down in the grating ›hotograph has a wave length of about 10,000 tenth metres, whilst hat of A has about 7,600, and of G 4,300, and of E about 5,250, so he photograph shows rays of light as much below A as E is above it.

I must again call attention to the overlapping of the grating spectra. It will be found that the extreme violet end of the second order of he spectrum overlaps the red of the first order; so that, really, when we are imagining we are photographing the red end, we get a picture of the violet end *plus* the red end. The first photograph of B to A was taken with red glass placed before the slit of the spectroscope, hence all the violet and blue rays were cut off. But it struck me that a photographic plate would have a much better chance of perfect results if, instead of absorbing this light (and also a certain amount of the red), we could separate the spectra. To do this, Fraunhofer's plan of placing a prism so as to refract the *length* of the slit before the beam reached the grating was adopted, and here are the results in a photograph taken with a small camera. It will be seen that we have four orders of spectra on the same plate, each one well separated from its neighbour. The photograph which showed the ultra red was taken by this plan, and no doubt you will have noticed that it was curved in its length. The curvature you must have noticed in all the four spectra which I showed, and is due to the irrationality of the dispersion of the prism. Had I used a widely-ruled grating I might have attained a straight band crossing the plate diagonally, but the loss of light would have been so great that I was forced to adopt the prism; for had I used the first order of the spectrum in both cases I should only have been able to utilise about $\frac{1}{100}$th part of the beam of light coming through the collimator, since $\frac{1}{10}$th would have been lost after using the first grating to throw the slit in one direction, and $\frac{1}{10}$th of that would have been lost by the other grating.

Now, as to the process by which the negatives were taken, I hardly know what to say. The process is the ordinary collodio-bromide process, made with zinc and excess of silver nitrate, as I have already published. This, in the ordinary way of making, possesses an orange tint by transmitted light, and is in this state wholly insensitive to the red rays—at least to those below B. If to some of this emulsion we add water, and very slowly distil over the solvents, rinse with alcohol, and then re-emulsify, we shall find that we have a film which is totally different in quality and appearance. The film will be much more powdery, if I may use the expression, the nature of the pyroxyline being altered, and a film showing blue light by transmission.

It is not every blue transmitting emulsion, however, which is sensitive to red rays. Some are insensitive to either the red or the blue, but if you get a film which is purplish in appearance you will probably have a film which is sensitive to both the red and the blue.

The details of the process with the modifications I, however, reserve to another occasion.

I must, however, point out the principles which have guided me in my researches. They may be briefly stated to be to find a sensitive salt which will absorb the rays in the portion of the spectrum which it is endeavoured to photograph. In the present days it is scarcely necessary for me to point out that absorption by any body indicates that work of some kind must be done in that body, either by separating the molecules of a body further from one another, or by the disintegration of the molecules themselves. In the first case we have heat developed, and in the last we have chemical action, producing what may be a developable compound. Now, in order that the red rays may affect a compound chemically they must absorb it, and by getting a blue film we get the desideratum. As you are aware, at first I obtained this by adding resins to the bromide, and thus effecting what I call a weighting of the molecules. In the last process the bromide itself, or its hydrate, weighs them and makes them swing in accordance with the red waves, and thereby absorbs them. If the pyroxyline be of the character to obstruct what are called the dark heat waves, we cannot expect to get much action of the spectrum on the sensitive compound occluded in it, and experiment serves to show that a horny collodion is not transparent in these heat rays, and is, therefore, not easily affected by the ultra red. A powdery pyroxyline, on the other hand, seems to be diathermous, and with a collodion made with it we have an effect in the ultra red, if the sensitive compound be absorbent of these rays.

Vogel found, if a bromide film was *slightly* dyed, that it became in some cases sensitive to the rays the dye absorbed, and in one paper seemed to indicate that it is the dye *per se* which is effective. My own experiments show that the dyes (much or little of them) only have effect when combined with silver, as I published in May, 1876, and I believe that Dr. Vogel found the same thing. The question, then, resolves itself into this: How is it that when the minimum quantity of dye is added to a film in which there is free silver that an image can be developed? The answer is easy: The compound of silver and dye is changed by light, and I have already shown that a film that is totally unacted upon by light may be developed by placing it in contact with one which has received an image; the changed organic compound of silver is in close contact with the bromide, and the image impressed on the dye is thus developed on the bromide silver.

When there is not sufficient silver nitrate in the film to combine with the dye (always supposing the dye will combine with the silver, which is the only case in which the employment of dyes have proved effective), the excess of dye acts very much in the same way that free bromide acts on an ordinary emulsion plate and prevents the impression of an image, the reduced compound being immediately reconverted into the normal undevelopable compound. The case of eosin is very much to the point, as it is an organic bromide. When combined with silver it is easily reduced by the light it absorbs, but if an excess of it be present this is reconverted into the normal salt. I may call your attention to the possibility of the existence of different weights of molecules. Faraday found that gold leaf, which is green by transmitted light, when heated became red, and remained so. If the red molecular gold were rubbed with an agate or other hard body, it would return to its green molecular form. In the same way, when we rub the film of silver bromide, which transmits the blue, we get the form which transmits the orange light. I venture to prophesy that the science of chemistry is on a fair way to be firmly mated with molecular physics, and the two combined will before long take a greater bound in advance than they have done as yet.

W. de W. Abney, F.R.S.,
Capt. R.E.

(To be concluded in our next.)

ON THE SOLARISATION AND OTHER RESULTS OF OVER-EXPOSURE: THE CAUSE AND THE REMEDY.

An Observation which may be Useful for the Explanation of the Formation of the Invisible Photographic Image.

[A communication to the Photographic Society of France.]

It is well known that the sensitive plate prepared by any dry or wet process ought to receive a definite time of exposure, so that the resulting negative should be good. Over-exposure is as fatal to the result as insufficient exposure. The object which I propose to myself this evening is to indicate the real cause of a bad result occasioned by too lengthy an exposure. As to the remedy it will be evident.

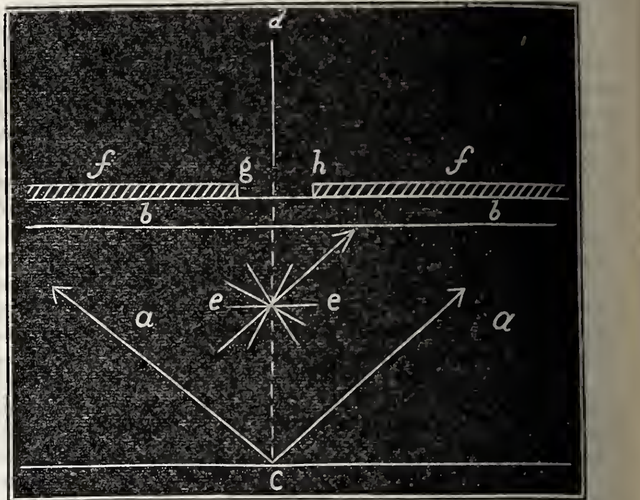
I will commence by a demonstration that will support my assertions with greater force than any arguments I could produce.

I present before you two pieces of black paper perfectly opaque, and from which several figures and openings are cut out that will serve for my negatives. Here is a glass plate prepared with an emulsion of bromide of silver. One-half of the back of this plate is covered with an orange-coloured backing. This other sheet is one of my sheets of sensitive tissue, consisting of a pellicle of collodion formed upon a sheet of paper, and covered by a sensitive film prepared with an emulsion of bromide of silver perfectly identical with that employed for the preparation of the glass plate. Thus we have two sensitive preparations made by the aid of the emulsion—the first being on glass, while the other is upon the tissue. I place both in a printing-frame under the negatives of black paper with the cut-out figures.

To obtain an exaggerated result, I give an enormous exposure to the brilliant light furnished by the burning of a yard of magnesium ribbon moved to and fro in close proximity to the printing-frame. The image produced is so visible one might say that it was produced upon sensitive albumenised paper, which proves that the exposure has been really very long. The two images are now developed together by ordinary alkaline development; but in order that the image may appear slowly the quantity of bromide of potassium is augmented, and there are but a few drops of the solution of carbonate of ammonium and pyrogallic with a considerable quantity of water. Now, let us examine attentively the appearance of the images. The first action of the developer produces effects nearly similar, but shortly afterwards we begin to observe a great difference between the two images. Look at the one on the tissue. Its outlines are very sharp; it gains in intensity the longer the developer acts; and after four or five minutes, when I consider the developing solution has lost its power, the image remains completely black and intensely opaque upon a white ground. Upon the glass plate the aspect is entirely different. At the commencement the image resembles that upon the tissue; but before the expiration of five seconds there forms round the opaque image a halo which extends with the development, and that part of the glass plate without orange-coloured backing is quite blackened by the progressive extension of the blurring. The other half of the glass plate resists more effectually the general extension of the darkening effects of the blurring, but it is, nevertheless, strongly pronounced round the outline of the image. After thirty seconds of development a new change appears before our eyes—the black parts of the image commence to become enfeebled; and now they are already more transparent than the halo or surrounding parts. The effect of the solarisation is become complete, and the image of the negative is changed into that of a positive.

To resume: here is the aspect of the phenomenon:—1. A glass plate having been exposed a very considerable time gives, on developing, at first a negative image. 2. Later on it becomes gradually enfeebled, and disappears under the continued action of the developer. 3. Around the image there forms a halo, which really is the cause of the image becoming transparent, and appearing positive upon the background of the halo. The orange colour applied to the back of the glass plate enfeebles the halo, but does not prevent its appearance entirely. 4. Neither the halo nor the solarisation appear in any degree upon the sensitive tissue.

In studying the cause of the blurring I am persuaded that it ought to be attributed entirely to the reflection and dispersion of the light by the substance of the glass of the plate. Its absence in the case where the glass plate is eliminated is a proof; but let us study more minutely the course of a luminous ray which strikes



a sensitive glass plate. *a a* represents the glass plate in section, and *b b* the sensitive film of collodion. The light in passing in the direction *d* can act upon the sensitive film *g h*, whilst the rest of the film is protected by an opaque body, such as the black paper *f f*. The sensitive film not being opaque the ray *d* will traverse it; it will meet still less obstacle in traversing the thickness of the glass. After having arrived at the point *c* it will be reflected by the back surface of the glass, and these reflected rays, in acting upon the sensitive film *b b*, will produce the effect of the halo.

We can, nevertheless, by painting an orange colour on the back surface of the glass, render innocuous the reflection from the posterior surface, and the reflected, non-actinic rays will no longer have the same chemical effect upon the sensitive film.* But the ray *d*, before arriving as far as the point *c*, meets with particles of glass *e e*, which become luminous under the lighting action of the ray *d*, reflecting in their turn the light in all directions. It is clear that they will produce the halo by acting upon the sensitive film as well as the reflected ray we have first examined; but, however, with this difference—that they cannot be rendered harmless.

After this explanation it is clear why the halo is more marked on the uncoloured part of the glass plate than on the other, which has been coloured; and it is also clear why there is no halo upon the tissue. I may mention here that this explanation of the cause of the halo has been questioned. It has been objected that the glass is too transparent for the particles in it to reflect light; but these sceptics cannot upset or render doubtful the results of this palpable experience. They have attributed the halo produced, notwithstanding the orange-coloured backing, to the colour not being sufficiently non-actinic, and consequently hold that the halo is produced alone by the reflection of the back surface of the glass plate. I shall, however, describe other experiments which will enable me to verify the exactness of my theory.

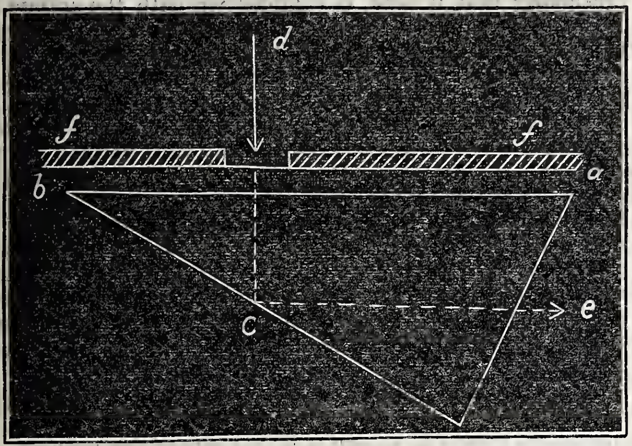
I have replaced the glass plate by a prism of optical glass. The surface *a b* of the prism was covered with a film of sensitive emulsion, and exposed to the light under a negative of black paper, with figures cut out as in the previous experiment, *f f*. It is easily understood in this case that the ray *d c*, in falling upon the surface *b c*, will be reflected in the direction *c e* in such a manner that the halo ought not to be formed in this case by the reflection of the posterior surface. Notwithstanding, a fine halo was obtained on developing in this experiment, which supports me in my supposition of the cause of the blurring.

Let us return now to the phenomenon of solarisation. The opinion of eminent authors whose attention has been occupied with the question of solarisation is very varied as to the cause of this

* All orange or brown colour, ground up with water, with a feeble addition of gum and glycerine applied with a brush, is good for this purpose. Moist colour may be had ready prepared at the colour merchants'. It is very easily applied, and has the advantage of being easily washed off before development. Collodion coloured with aurine can also be used for the same object, making, with the aid of pyroxyline, an opaque and powdery film.

phenomenon. Some call it the "reverse action of the light;" all attribute it to a mysterious property of light, and even see in that *an evident proof that the cause which produces the latent image is not chemical but purely physical.*

In taking as a base, however, the experiments made before you, I wish to propound a very different opinion. I commence by recalling to your mind that the glass plate at the commencement of the development presented to us a normal aspect; that is to say, the



exposed parts became black, and it was only afterwards that the black matter commenced to become enfeebled, and so continued up to complete effacement. It is not, therefore, light which produces the reversed effect, but the normal image obtained at first disappears under the prolonged action of the developer.

For the sake of clearness I shall propound a theory, and I shall prove it step by step in applying it to the explanation of the facts we have observed.

By the action of light the force which unites bromine with silver in the bromide of silver is weakened in proportion to the quantity of light which has acted upon the combination; nevertheless, these forces are not completely broken, because the liberated bromine does not evaporate as we might expect a substance so volatile, but remains near the place where it has been formed, and it manifests itself when circumstances present themselves.

Thus it is the bromine which occasions solarisation, in uniting itself to the water of the developer to form hydrobromic acid, which, in its turn, attacks the metallic silver scarcely formed by the action of the developer.

We have observed that solarisation does not take place on the tissue. This fact was for a long period a stumbling-block to all my hypotheses, but accident rendered itself a very useful auxiliary. The experiment which I have had the honour of presenting before you I was repeating in the presence of several of my friends, when one of these gentlemen accidentally opened the holder which contained a piece of tissue already exposed under the black paper with its cut-out figures. I stopped him quickly in this act of thoughtlessness, but not before the sheet of tissue had suffered general exposure, although very feebly in comparison with the previous one. Here is what followed: the image appeared as ordinarily, but the entire sheet was fogged, as one might expect. I held the sheet inclined to a corner so that the developer might run off, and then observed that the uniformly fogged tint commenced to disappear in the proximity of the figures already developed, and streaks were formed in the direction favoured by the inclination of the sheet as if some substance oozed out from underneath the black figures, and, obeying the law of gravity, descended slowly, dissolving the silver which formed the general veil. I concluded then that upon the tissue, also, the bromine liberated itself in a similar manner as was the case upon the glass plate, only the silver forming the image found itself in a different condition, probably caused by the film of caoutchouc which preceded it, and ought not to be attacked by the hydrobromic acid. To convince myself of the truth of this theory I have varied the experiment by covering with emulsion a silvered glass. After the exposure and the development I dissolved the film of collodion with its developed image by the aid of ether and alcohol, and then to my great joy I observed that the layer of silver on the glass had been attacked by the bromine just under the developed image. Thus, supported by this fact, I am authorised in saying that solarisation proves by the evidence here given that the cause which has produced the invisible image is purely chemical.

In the phenomenon observed I believe I am able also to find the reason why dry plates do not keep for a long time after exposure. It is the bromine liberated by the light which, little by little, other circumstances aiding, recombines itself with the silver and restores it to the same condition in which it was before exposure. Thus I find myself face to face with the problem of the day—how to prepare dry plates that will keep during an indefinite time after exposure.

Although I have not yet arrived at the point of unravelling this problem, I believe that the solution may be found in the introduction of some substance which, by preventing the recombination of bromine with the silver, preserves the breach formed by the light in the forces which united them before exposure.

It remains for me to observe that the absence of the blurring and solarisation upon my tissue enables me to employ it with advantage in the reproduction of negatives for combinations and enlargements. It is also for the same reason that the carbon process is justly recognised as superior to all systems where glass is the support of the sensitive film. Emulsions strongly coloured will be good if the colouration used does not affect or diminish their sensitiveness.

L. Warnerke.

ON DRY-PLATE PROCESSES.

[A communication to the Photographic Society of Great Britain.]

Having been requested by our President to detail the result of my experience in dry processes, I must say that, while responding to that request, I yet feel that it is somewhat presumptuous on my part to do so, mainly from the fact that I have nothing particularly new to communicate; but I trust that these few remarks may lead to a discussion which will enable many present who have had experience and long practice in this branch of photography to give us the result of their experiments.

You are all, doubtless, aware that Mr. Paget has offered a very handsome prize for a dry process which, with good keeping qualities, shall give results as good as those obtained with wet plates. As this offer may, perhaps, induce many photographers to devote more of their attention to the preparation of dry plates, I premise that it would not be inopportune for me to mention briefly some of the dry processes used in the early days of photography, and to call attention to the various methods which have been practised from time to time, and which in certain hands have been successful, particularly when long-keeping qualities were not a desideratum.

It is now about fifteen years since I commenced dry-plate work. My first experiments were with the Abbé du Prat's resin process, which consisted of the addition of one grain of resin to the ounce of collodion; but unfortunately (for the process is a very simple one) the sensitising bath would become disordered after the immersion of a few plates. I tried various resins and gums with a view to overcome this objection, but in every case the bath quickly deteriorated.

About this period Major Russell's tannin process was published, and for a considerable time became very popular. I worked it at that time myself, and was quite successful when the plates were freshly prepared, but showed a disposition to solarise, and, after long keeping, to produce hard negatives.

I was next induced to try the Taupenôt process; but this requiring a double bath—the sensitising of the plates a second time, besides other tedious preparations—led me to adopt a modification of it, and which modification was published by me in 1869. This, I found, gave better results, and required but one bath. The following is a short *résumé* of the method:—After sensitising the film, a solution, consisting of one part of albumen to one of water, was poured over the plate, which was then rinsed, and a fifteen-grain solution of nitrate of silver applied, a final washing finishing the process. These plates were developed with alkaline pyro.

I mention this process as being one of my early loves, and one with which I was most successful, having produced thereby some 300 negatives of Rhine scenery. But in spite of my lingering affection for it, I must confess that its keeping qualities were not altogether satisfactory, and I reluctantly gave it up for the gum-gallic process of my friend, Mr. Russell Manners Gordon. Great credit is, I think, due to him for that process, as it was a great advance upon what had been done before, so far as the keeping qualities of the plates were concerned and the beautifully soft negatives produced. Many, I believe, still follow the process, and I have an example amongst the series of Swiss views shown this evening, and taken in 1870. Mr. Gordon has, I am informed, great faith in the keeping qualities of this process, but my own experience has not borne out this view. I have found that when the plates have been exposed and developed soon after preparation, that negatives of excellent quality—leaving, in fact, little to be desired—could be obtained; and I would strongly recommend it to amateurs as a very good and simple process, but one not perhaps so well adapted to the requirements of the professional photographer, who must necessarily, at times, prepare his plates many days, and perhaps weeks, before he has the opportunity of using them, and then frequently a long interval between exposure and development.

I can also speak very highly of Captain Abney's beer process. The negatives taken by me, and the prints from which obtained the award at the last exhibition of this Society, were produced by a modification of his process, and which I will briefly describe. To any good commercial collodion is added (in addition to the usual iodiser) two grains of bromide of cadmium. The sensitising bath to be of not less strength than from forty to forty-five grains to the ounce, the plate remaining immersed from four to five minutes. After removal from the bath, and before applying a preservative of beer only, the plate is thoroughly washed. The plate should then be dried, and before exposure in the camera a wash of pyro. solution, one grain to the ounce of water, should be applied to the plate and again dried. Captain Abney gives the formula for the preservative as beer to each ounce of which one grain of pyrogallic acid has been added. Through an accidental occurrence I have modified this, and will here describe it. While working the process during my stay in Switzerland, nearly two years since, I was attempting to develope a plate with the plain pyro. developer, but to my surprise no image would make its appearance. On consulting my diary of exposed plates I found this particular one had not been exposed at all, so that my failure was easily accounted for. After washing the plate I placed it in the drying-box with the intention of exposing it on some future occasion, being curious to know what the result might be. About a fortnight after, having a little leisure, I placed this plate in the camera, and gave it a little longer exposure than I should have given a wet plate. Much to my surprise I obtained a very perfect negative—in fact, superior to those I had been previously obtaining. Not feeling, however, quite confident, I prepared another plate in the manner above described, and after drying moistened one half with water, and poured over the moistened film a one-grain solution of pyro., then rinsed slightly and dried. This plate, stereo. size, I exposed with twin lenses, and on development the half which had been treated with the final pyro. wash showed greater sensitiveness and better quality, particularly in the deep shadows, which were very perfectly developed, and was altogether more in harmony with the high lights than those in the half not so treated. I now felt such confidence in this modification of Captain Abney's process that I confined my operations solely to it, and produced nearly 200 negatives during my stay in Switzerland that season. Amongst them were some very trying subjects, which tested to the utmost extent its capabilities. I may also add that these plates kept well, both before and after exposure.

As you are aware, there are several other dry processes—the coffee and its modifications, also the morphia, the latter giving very sensitive plates, but with no keeping qualities. These and other processes I have had experience with, and should have preferred to have made some remarks upon them would it not be taking up too much of your time, and perhaps trespassing a little too much on your patience. I have latterly, however, worked zealously at the collodio-emulsion, and with very promising results, and shall endeavour to test it in every possible way with a view to ascertain if the keeping qualities of the plates may be relied on before and after exposure. Certainly, an emulsion process has considerable advantages, not the least being its simplicity, and the non-requirement of a sensitising bath. Although I have worked it for several months past, the results, to my mind, have not quite equalled the before-mentioned process; but I am in hopes, with some experiments now in hand, to be more successful; and should I be so shall have much pleasure in affording you all the information in my power. I have not entered into the details of the various dry processes, as their manipulation is now so generally understood; and I therefore make no mention of Colonel Stuart Wortley's uranium process, nor of the gelatine process of Mr. Kennett, and some others which I have tried, but have not followed up sufficiently to enable me to give information which may be of any service.

Before concluding I must strongly impress upon every one working a dry process the necessity of exercising the greatest care in the selection of pure chemicals, and in the cleanliness of all the various manipulations. Drying the plates in a pure atmosphere should be particularly attended to. There is no question that to be perfectly successful more care and nicety is required than in the ordinary wet process. WILLIAM ENGLAND.

ON THE LATENT IMAGE.

THERE are several points met with in practical photography which, when viewed in connection with the chemical theory of the latent image, are difficult to understand by the light of that theory. One of these is the peculiar action of the bromide of a monad—as potassic bromide—has upon the latent image when again acted on by light. I refer to the "reversing action of light."

Now, as far as I can understand, it is impossible that potassic bromide can give up any of its bromine to the sub-bromide (?) of the latent image. But, then, how does it, presumably, convert the sub-bromide into the bromide of silver? Have we any reason for presuming that it acts, in combination with the actinic rays, catalytically, causing the bromine in combination with the organic matter of the film to re-combine with the sub-bromide?

I suppose that the result obtained by MM. Claudet and Becquerel, who, on exposing one of the silver haloid salts to light, and then placing it under red or orange glass, found the latent image to be destroyed, has not been at any time verified by other experimentalists. Of course the exposure referred to would be a long one*. But this by the way.

At page 39 of THE BRITISH JOURNAL OF PHOTOGRAPHY for 1872 there is a short article by Dr. H. Vogel, in which he shows that the latent image in silver iodide produced under silver nitrate has different properties to that formed under potassic ferricyanide. For the sake of those of your readers who have not the Journal in question to turn to I will transcribe some of Dr. Vogel's remarks. He says:—

"According to the general opinion the iodide of silver is simply reduced to sub-iodide of silver. My experiments show, however, that the case cannot always be so simple as this supposition assumes. The invisible image which is formed when iodide of silver is lighted under nitrate of silver is entirely different from the one which is formed in the presence of ferridcyanide of potassium. The ferridcyanide of potassium accelerates this action of light almost as much as nitrate of silver; but the invisible image of iodide of silver which has been formed under nitrate of silver disappears when treated with iodide of potassium, while the image of iodide of silver which has been formed under ferridcyanide of potassium does not disappear under a solution of iodide of potassium. We find the same difference already in iodide of silver plates which either have been prepared in a fresh bath or in one which has been surcharged with organic substances. The picture on the plate which has been prepared in a fresh bath disappears under iodide of potassium, but the other remains. This shows the influence of organic matter in the bath.

"It is not without interest that not only iodide of potassium, but also ferridcyanide of potassium solution, exercises a destroying influence on the iodide of silver image which has been exposed to light under nitrate of silver, while the ferridcyanide of potassium solution by itself accelerates the action of light on the plate."

This is a very plain statement.

Now it is worthy of notice that Dr. Vogel states that the latent image formed in an iodide plate sensitised in a *fresh* nitrate bath is destroyed by a solution of potassic iodide, and this without exposure to light as in the "reversing action" method. In what way does the potassic iodide act? It would seem that just as by its presence (*not* chemically) it can *prevent* the formation of the latent image, so by its presence also it can *destroy* the latent image. I do not know, however, that we have positive evidence that the latent image would not assert itself on washing all the potassic iodide out of the film, and then applying the developer, so that it is possible that the latent image is not really destroyed.

Another point is this:—According to the generally accepted chemical theory the silver sub-bromide is formed in exceedingly minute traces, even in the high lights; and yet, on development, the whole of the bromide may be reduced to the metallic state. This being so, if a quantity of sub-bromide which may be represented by the figure 4 causes the entire reduction of the film represented by 100, why may not a quantity represented by 1, by a prolonged development, produce the same result? In other words, why are we not apt to find that a prolonged development reduces by degrees the whole of the bromide down to the glass? It may, perhaps, be accounted for thus:—The silver sub-bromide may, in the high lights, be distributed at equal intervals throughout the entire thickness of the film, each molecule being surrounded by silver bromide. This is the effect of an amount of light represented by (say) 50. If the film be acted upon by light represented by 100, we have the effect of the light represented by 50, *plus* the effect of an exactly equal amount of light. What is the effect of these surplus rays more than sufficient to bring about total reduction on development? I should suppose that a certain

* This paragraph now needs some explanation. It was written several weeks before the publication of Captain Abney's recent investigations. It here appears that the red and ultra-red rays are destroyers of the latent image by accelerating oxidation of the latter. It is somewhat curious that some such rays as these have been termed "continuating rays," so that it would here appear that "extremes meet."

number—perhaps not double the number—of molecules of sub-bromide are formed in addition to those formed by the light represented by 50, the reduction on development is thus quicker, the progression or space between molecule and molecule being less.

It would thus appear that in order to reduce the bromide down to the surface of the glass it is necessary that there be molecules of sub-bromide in actual contact with this surface, each molecule forming a nucleus doing work in its immediate neighbourhood, the reduction proceeding especially *upwards;* that is, if a film were reversed after exposure, the exposure being such that a half-tone only would appear on prolonged development, and then reversed face downwards as another plate, on development the film would be reduced totally, as if fully exposed. In the case of the middle tints sub-bromide may not exist in more than the upper or surface portion of the film. Even if this were not altogether the case, and a few molecules were imbedded deeper in the film, it is quite possible that that peculiar action of the soluble bromide—which would be gradually increasing in the developer—would have its effect upon them.

I have already referred to the "upward" tendency of development from the sub-bromide forming what I call the "nucleus." If we do not recognise the influence of the sub-bromide in this particular direction, and in no other, how are we to account for the fact that a church spire, provided there be no halation, occupies in the negative the same space as it does on the focussing-screen, the influence of the sub-bromide not proceeding laterally?

HERBERT B. BERKELEY.

A TOURIST'S PRESERVATIVE DRY-PLATE PROCESS.

[A communication to the Photographic Society of Great Britain.]

As it may not be inopportune for members to describe the dry-plate process which they find the most practically useful, I venture to direct attention to the following. My aim has been principally directed to prepare films by the use of a collodion and bath, combining with long-keeping properties adaptability to the ordinary wet process worked with iron development. The great susceptibility of highly-sensitive films to injury from weak luminous radiations during preparation, exposure, and development render reliable plates of moderate sensibility a perfect desideratum. Such, when worked with others of high sensibility, if easily prepared and developed away from a specially-constructed laboratory, constitute in my view essential requisites for the amateur landscape photographer.

The method I adopt for the preparation of films of the less sensitive type it is my present purpose to describe. Although any collodion of recognised standard excellence for iron development is perfectly suitable, yet I should deem this description incomplete were I to omit a formula equally adapted to this or the wet process. I must confess that, in the manufacture of pyroxyline, I have not found the three-to-one proportion of sulphuric to nitric acid—originally recommended in the patent for explosive cotton, and subsequently ably advocated for the soluble varieties—to be the best. The employment of a larger quantity of nitric acid to the sulphuric yields, in my hands, a better result for the soluble kinds. The following formula is based, therefore, on this consideration:—

Sulphuric acid, sp. gr. 1·84	6 fluid ounces.
Nitric " " 1·42	3 " "
Water	5¾ fluid drachms.
Cotton	150 grains.

Temperature, 155° Fahr. to 145°. Time of immersion, 10 minutes.

The double temperature given signifies that, at the time of the introduction of the cotton, the acids should be at 155°, and the allowable decline must not exceed ten degrees. Six fluid drachms of a plain collodion, made by dissolving from five to six grains of the above pyroxyline in a mixture of four fluid drachms of methylated ether, sp. gr. ·720, and two fluid drachms of pure alcohol, sp. gr. ·820, is to be mixed with a bromo-iodising solution made as follows:—

Sodium iodide	6 grains.
Cadmium bromide	4 "
Iodine	½ grain.
Gum guiacum	¼ "
Alcohol, sp. gr. ·820	2 fluid drachms.

Before coating the plate I apply a substratum consisting of an ounce of liquid albumen and thirty minims of "liquor ammoniæ," sp. gr. ·959, dissolved in an imperial pint of water. After the plate is coated, excited in an ordinary argentic nitric bath and removed therefrom, it is to be freely washed in ordinary water kept in motion, and then treated with the following preservative, poured on and off the film twice or thrice from different parts:—

PRESERVATIVE.

Albumen	1 fluid ounce.
Glucose solution (raisins one part, water five parts)	2 fluid ounces.
Water	3 "
"Liquor ammoniæ," sp. gr. ·959	15 minims.
Ammonium chloride	3 grains.
Ammonium bromide	½ grain.

The film is again to be freely washed with ordinary filtered water, covered with a three-grain solution of gallic acid, and evenly dried. The back of the glass, as a matter of precaution against very trying conditions rather than as an ordinary necessity, should be covered with a non-actinic colour. Burnt sienna, ground in water and mixed with a little gum mucilage, constitutes a good medium for the purpose.

At any convenient interval after exposure the film is washed, and developed with a suitable quantity of solution made in the following proportions:—

Water	4 fluid drachms.
Pyrogallic acid (sixty-four grains dissolved in one fluid ounce alcohol ·805)	15 minims.
Potassium bromide (sixteen grains in one ounce water)	15 "
Sodium carbonate (sixty-four grains in one ounce water)	15 "

Five minims only of the potassium bromide should be added in the first instance, and the remainder upon the earliest indication of an image. As soon as the general details of the picture become faintly visible by reflected light the alkaline developer should be removed, and a three-grain solution of citric acid applied. The intensification may then be effected with pyrogallic acid, citric acid, and argentic nitrate, and the unreduced salts dissolved away with sodium hyposulphite as usual.

T. SEBASTIAN DAVIS.

Correspondence.

MICHAUD'S PHOTO-ENGRAVING PROCESS.—EXHIBITION NOTES.

M. MICHAUD has kindly given me several of his first attempts in photo-engraving, which are very good, taking into consideration the isolated place in which he has lived down in the distant department of the Isere, and far away from Paris and its numerous advantages. He has taken out patents for France, England, and the United States.

Details of the process cannot yet be given; but I have some reason to believe that the principle of the application of metal in a state of fusion upon a bichromated image is involved, which renders the process remarkably expeditious and easily worked by any intelligent person even unacquainted with the numerous processes for obtaining printing surfaces. It is very economical, for I know that a copperplate for which £10 was asked by a photo-engraving company has been made, and as well done, by M. Michaud for twenty-four shillings. It is in this direction, especially, that M. Michaud (who is a country chemist and druggist, &c., and who has had the misfortune to lose one of his limbs) is to be welcomed as a new competitor for public favour, and also for showing that progress may be made without costly machinery and appliances by the comparatively uninitiated in the secrets of photo-engraving, and that to the photographic profession, as well as to amateurs, the course is open to all comers. Contrary to what might be imagined, the heat applied does not destroy the bichromated image.

The following is a copy of the communication made by M. Michaud to the Photographic Society of France at its last meeting, respecting what was designated a process to obtain metallic plates, engraved photo-chemically, without any retouching, and by any artistic design in painting, water-colour drawing, maps, or plans, and for which is claimed the following advantages:—1. It transforms, in a brief period of time, a photographic negative into a metallic plate which can be used at once. 2. The immediate production of a lithographic surface which may be delivered to the trade within twenty-four hours of the reception of the order, and, if pressed for time, even within six hours. 3. The production of a typographic block which can be delivered on the second or third day. 4. The preparation of a type or galvanic mould in relief capable of producing also by the electrotype either a direct plate for the copperplate printer, or—5. A thin plate delivered at once in the form of ornamental jewellery of all dimensions, of surprising beauty and fidelity of reproduction, and giving—6. Another series of productions, properly speaking, called the photo-chemical plate, of simple or of more or less ornamentation, which may replace the ordinary copper-engraved plate; an operator in this style can produce as much as the work of two hundred engravers. And lastly—7. The constant results, as well as the enormous reduction of actual prices, are correlative facts of this new process, the principles of which are so simple and so perfect as to leave no doubt as to the successful applications above stated.

The negatives required must be sharp, clear, full of detail, and vigorous.

The method adopted by M. Michaud for reversing the position of a negative film upon the glass plate is as follows:—Dissolve seventy-five grains of gelatine in three and a-half ounces of water, filter, and, while fluid, float upon this bath for three minutes a pellicle of castor oil collodion, which should be attached to a slip of wood that serves to support the pellicle throughout this operation, and until dry, when the films thus prepared are immersed one after another in a five-per-cent. solution of alum for two minutes. They are then washed, dried, trimmed, and preserved between sheets of smooth paper until required for use. The negative that is to be transposed is, after being fixed and washed, placed in a vessel of water, the film upwards. The gelatined pellicle is placed in another tray of water with a sheet of waxed paper of a larger size than the negative, and when the water runs freely over the pellicle its gelatined side is applied to the negative in the other tray, and the two are raised up together, avoiding the formation of air-bubbles between them. The sheet of waxed paper is then laid upon the pellicle, and the squeegee is applied to obtain perfect contact. The waxed paper is next raised, and it may be reserved for continual use. The glass of the negative is wiped dry, placed in a printing-frame, covered over with a dry and thick sheet of blotting-paper, and the spring back is shut. The frame is then exposed to the sun, or over a drying-stove, when the desiccation is rapid. The dry negative is now placed in a tray of warm water, and after a quarter of an hour or so the film with the image can be detached with the hand, and should be dried as before, when it is ready for immediate use. If the pellicle be very thin, and in consequence very difficult to handle, it may be transposed and re-attached by the squeegee to a glass plate simply gelatined and dried beforehand, and then finally dried as before.

Instead of detaching the negative as above described by means of a pellicle of collodion, which possesses several advantages over gelatine as usually employed, a sheet of simple waxed paper may be used, when treated exactly as before described for the pellicle. These negatives have no need to be attached again to glass; it is sufficient to place them between dry sheets of thick blotting-paper, and to pass over them a hot iron so as to give them the necessary flatness and transparency.

The full printed regulations for photographers in the Paris Universal Exhibition have at length been issued, the *first* copy being sent by M. Bergu, the Director-General of the Foreign Sections, to (as the French newspapers style and print him) "*sir* Cunliffe Owen," and which Mr. England was good enough to show me. According to this document *any* photographic exhibitor has the right to demand a card of admission giving him the privilege to take photographs of the palaces, park, gardens, grounds, and the different groups and classes, except the Fine Arts, for which a special card must be obtained, but which will not be granted by the British Commission. Any photographer persisting to photograph in that portion will be removed by force, *if* necessary.

For photographing in detail anything exposed a copyright permission in writing by the maker or owner must first be obtained and lodged with the Commissaire General; the demand for the card to photograph must also state the number of operators and other persons, and the apparatus and process (wet or dry) to be employed, with other details. The photographer at the same time binds himself to supply the Commissaire General with five copies of each photograph taken, which will become the property of the French State, and, in addition, he must protect his copyright in each photograph or negative published by him in France by the regular deposition at the Ministry of the Interior of four copies of each, otherwise he will run the risk of having his works pirated. Thus, on the whole, he will have to furnish nine copies gratis before being able to legally sell a single print. The hours for working are fixed as being from seven o'clock until ten in the morning for the interior of the exhibition, and until eleven o'clock for the exterior. The photographer will be subject to such further rules and regulations as may be drawn up; also to the general laws and pains and penalties for damage or injury done. The Commissaire General reserves to himself the right to withdraw or suspend the card of permission of the photographer, or any of his operators or other persons employed by him, for any cause whatever.

Mr. England was the first exhibitor who received the printed regulations and card of permission to photograph. Mr. Warnerke, Mr. York, and Mr. Payne Jennings have also applied for permission.

The photographer whom I reported in one of my recent letters as at work on the opening day was M. Appert (brother to General Appert), and who is the official photographer to the French Commission. He is working with wet collodion in a square tent resembling, in outer form, Smartt's tent, and has alone permission to work all the day for the Administration. His focussing-cloth is large and is suspended over rods attached to the top of his camera, hanging so well over the lens and the sides as to form a perfect sky-shade, thus advantageously replacing the usual inefficient cone. The plates used for the opening ceremony were $21\frac{1}{2} \times 17\frac{3}{4}$ inches, and for daily work 16×12 inches. The lens employed was a four-inch one by Auzouz and Français.

M. Queval, who has recently published the Taupenôt process he has hitherto used for his stereoscopic negatives, especially those of his excellent London views, has since the opening day commenced working; but I find he is a convert to the emulsion process of M. Peuch. He prepares each night twenty-five plates, which he encloses in Bristol cardboard slides, and exposes them the following day, developing the same night.

The stereoscopic camera of M. Queval is worthy of notice. By a series of screws, a pair of the heads of which correspond accurately with the focus of each pair of lenses he uses, the glass focussing-screen and cloth are completely suppressed. The carrier end of the camera, to receive the black cardboard plate slides, has only to be placed in contact with the pair of screw heads corresponding to the focal length of the lens used to render it certain that the plate is in perfect focus, and is maintained in that position by the elastic body of the camera. Sight points on the top of the camera indicate the subject embraced by each lens; and the rapidity with which the camera is fixed and the plate exposed in busy thoroughfares before a crowd has had time to congregate around the photographer is delightful. This camera is not new, having been practically tested for years in France, England, and other countries.

MM. Leon and Levy and MM. Lechenal and Co. have also obtained cards as well as the company (limited) working out Braun's business; so that it will not be for want of photographers if the public suffer in the supply of photographic representations of the Paris Universal Exhibition of 1878.

The photographs in the Austrian section are not yet unpacked. Herr Luckhardt is named as a juror for Austria. The United States, Canada, and Portugal are in arrear with the completion of their display.

As the classes 12 and 15, in which we are more particularly interested, are now throughout the exhibition approaching completion, the general aspect is much changed, so that a more mature judgment may be formed of the comparative merits of the various exhibitors.

In connection with the exhibits from the United States I strongly recommend for study five frames of pictures of cabinets and cards by Sarony, of New York. Their individuality, freshness of artistic posing, light and shade, combined with effect and definition, together with manipulative skill, have never been excelled.

There is also near to Sarony's display a new competitor for public favour, especially by the ladies, in the person of Joshua Smith, "instantaneous photographer," of Chicago, who exhibits a sheet $21 \times 16\frac{1}{2}$ inches covered over with portraits of babies and very young children. There are nearly one hundred of these juveniles' portraits arranged and vignetted in such a way as to merge one into the other, thus producing a very excellent effect. There are all the most unaccountable positions that babies alone can take, and that we *cannot* imagine, as well as the hundred-and-one facial expressions so varied and so dear to all doting mammas. This picture is labelled, in quaint American phraseology—"We came all the way from Chicago." The printing is firm, the whites pure (as in all good American printing), and although evidently the most rapid exposures have been given, the half-tones and modelling are perfect, while the shadows are in due keeping. This central picture is surrounded by scores of *cartes de visite* of babies and little children fastened to the background of the frame with drawing-pins, and so clamped down as to make the *cartes* take a vertically round surface. They are vignetted portraits in the "English fashion," as the French have it.

On the wall space on the left hand of the entrance to the French photographic court in the second great transversal avenue is hung the attractive work of M. Victoire, of Lyons, and to which his simple but appropriate fittings add value. He, unlike some of us, has given sufficiently large spaces of dark red purple tones between the gilded chamfers which thus separate advantageously each picture; for when the prints are placed too near each other, as in some English examples, the close contiguity of one to the other injures them most seriously, and in common *parlance vil* this fault is curtly expressed by the phrase, "Oh! by Jove! the frames are too crowded, and there is not breathing room left between the prints!" M. Victoire's works refute the remark generally made by the observer when examining photographs prepared for competition that they do not represent ordinary daily work of the artist, are the result of elaborate retouching, both on the negative and on the print, and of great and unexceptional care throughout, forming no criterion as to the artistic worth of the ordinary proofs delivered to the artist's photographic clients. As an instance of this I may mention the case of a photographer at Landernau! "not a hundred miles from me," who has had awarded to him no end of medals, but whose work, as delivered by him to his *clientele*, I should be ashamed to sign. M. Victoire, in direct opposition to such a system, has obtained from his patrons the loan of the pictures he exhibits, and which had already been delivered and paid for, thus forming his contribution to the French court. These works are sure to be "medalled," and they will thus be returned to their owners with increased value. Such pictures are as much a loan as the numerous oil paintings and water-coloured drawings that, thanks to enlightened connoisseurs, adorn the walls of the British and American fine art collections.

The studio of M. Victoire is placed on the *entresol* at the corner of two streets, with houses on the opposite side of one street three or four stories high and confronted, in the other street, with houses five or six stories high; hence the light was blocked out. In order to remedy this state of things M. Victoire has ground glass for the whole of both top and side lights, and to this may be partly ascribed the beautiful roundness of the heads and arms of the personages photographed, as well as the solidity of their bodies—meaning by this as far as regards height, width, and thickness—which causes the figures to stand out and be well detached from the backgrounds, in contradistinction to those badly-lighted pictures we too often see even in the oil-painted portraits now exposed in the fine art sections in the palace of the Champ de Mars, as if they were only of height and breadth without thickness, or cut out of paper and pasted against the backgrounds. As an instance of contrary treatment the photographic visitor should examine the wonderful portrait of Thiers, by Bonnat. The above good qualities of the pictures of M. Victoire are also due, in a certain measure, to the negatives being, as a rule, always *over-* than *under*-exposed. The lens used for the *cartes* was the three-inch orthoscopic of M. Darlot, of twenty-one inches focus, stop No. 2. The exposures were fifteen seconds for the cabinets and eight seconds for children. The exposure for the 16 × 12 ins. pictures was from thirty to forty seconds, and for the 22 × 18 ins. from forty to sixty seconds. The fine results of these arrangements may be ascertained by looking at the light satin dress of a full-length standing figure of a lady, where the rich sheen and precise texture of the costly material are truthfully and naturally reproduced. A portrait of the same lady, and in the same dress, is shown by another photographer; but the lustrous surface of the dress is not at all properly rendered, and it would be difficult to say of what material the dress was composed, while it can easily be imagined how the "face divine" must have suffered, redeemed only in this case by the theatrical attitude given to the figure.

M. Victoire's collodion (half as much bromide as iodide) and development with iron are as used seven years ago, in accordance with the good old formulæ, and which, after all the novelties, gives the best result. The prints are on albumenised paper prepared expressly with four per cent. of chloride, and sensitised upon a silver bath of sixteen to seventeen per cent. For the toning bath four litres are made at a time with one and a-half to two grammes of gold per litre, thirty grammes of fused acetate of soda, and three grammes of carbonate of soda. The prints are left but a short time on the gold bath, and then well and quickly washed, giving very rich, warm, permanent tones. M. Victoire is an old collotype worker, having gained the gold medal at the International Exhibition of 1872 for the same after the jury had worked out the process in detail in his laboratories. He says that he uses silicate of soda to harden the printing film of gelatine spread upon a copper plate, which enabled him to print hundreds from the same relief, and that chloride of calcium gives the grain in the photo-engraving based on Woodbury's process by M. Rousselon, who has a grand display adjoining occupying a wall space of eight yards wide by three yards in height, but of which more anon. W. Harrison.

Asnières (Seine), May 20, 1878.

RAPID GELATINO-BROMIDE PROCESS: FURTHER DETAILS.

To the Editors.

Gentlemen,—Your correspondent "D" should multiply the quantities by ten if he desire ten ounces of emulsion, and employ, as directed at page 146 of your Journal, four ounces of water for the bromide and two for the silver. He will, before setting it to wash, therefore have for his final ten ounces—

Bromide of ammonium	70 grains.
Nitrate of silver	110 ,,
Gelatine	200 ,,
Distilled water	6 ounces.

The remaining four ounces to make up the ten will be obtained thus:—The gelatine, in washing, will have absorbed (say) two ounces from the washing water, consequently he must add two ounces still further to make up the ten, or otherwise do as follows, which I think is better: let the last two ounces consist of water and alcohol (say three-quarters of an ounce of the latter).

In my previous letter perhaps I observed brevity too much. I offered the remarks found at page 146 to those already experienced in gelatine work, and so did not allude to the *manner* of coating, nor to the *use* of the intensifying dish. The latter is useful in treating a plate accidentally over-exposed and consequently too thin, in which case, after the alkaline development, fix, wash, and dry; then flood with pyro., citric acid, and silver, the same as for wet collodion plates. Density is easy to obtain.

To coat: warm a quantity of plates in an oven, to appear upon touch a little warmer than the hand; place them on the table to the left of your seat, and the emulsion (immersed in a jug of water at 90°) on your right. Coat same as with collodion, but only drain *partially*, leaving enough on the plate to appear about three times as thick as with collodion. Level it as much as possible with your plate-holder for a few seconds, till it has subsided into a perfectly even sheet; then slide it on to a piece of plate glass—say twenty inches square—which has been previously levelled with a spirit level; and, if you are using glasses half-plate size, by the time the plate glass is covered with them the first one coated is probably set enough to slide it to another part of the operating-table, which should also have been previously levelled by placing wedges on the floor under the legs of the table.

If the plates have been thoroughly cleaned the emulsion will flow like collodion; but should it not do so use a warm glass rod to lead it over the plate, and have them better cleaned next batch. For beginners it much helps the coating to double the quantity of alcohol, leaving out water to that extent. The operator should not be alarmed at the peculiar mottling of the film (due to the alcohol) directly after coating; this subsides in a few seconds to an even surface. The extra alcohol does not appear to alter the sensitiveness, and is a great help; but with experienced workers it is not necessary, and the quantity mentioned at page 146 is sufficient to draw the emulsion up to the edges, which is the sole object of introducing it. When no alcohol is used you have always *thin* edges, which is very objectionable, as the negative, of course, will print dark at those parts, and this small addition of alcohol totally rectifies this fault. It is difficult to measure the exact quantity of emulsion required for each plate; one ounce would probably cover *eight* plates of $6\frac{1}{2} \times 4\frac{3}{4}$ size.

By darkening a good-sized room temporarily for coating it obviates the necessity of a drying-box, for if the films can lie on the table for twelve hours they will be dry, or sufficiently so to stack up in an ordinary box. I cannot trespass further on your space, but will gladly answer "D" any further queries through the post, should he desire it.—I am, yours, &c., C. Bennett.

May 21, 1878.

THE "IMPOSSIBILITY OF FADING."

To the Editors.

Gentlemen,—Will you give my compliments to the "Peripatetic Photographer," and tell him I shall be happy to give him a few lessons in English? I have given him a week's grace to see the error of his ways, but as he has not done so he must be pilloried. He states that the sense of the sentence, "to remove all doubt as to the impossibility of fading," which appears in an advertisement of mine, is that the picture alluded to will fade. He is utterly wrong. The thesis to be proved or disproved is, "the impossibility of fading." Doubt being removed, the thesis is established, *i.e.*, fading is impossible; nothing could be plainer.

Further: he wants to know what sort of a basis my "second best" works of art are produced on. I do plenty of "tinted" work—a few shillings for a "tinted" silver printed *carte* in water colour, and as I know, and Mr. "Peripatetic Photographer" knows, or ought to, water colour work in silver prints always fade, I scorn to advertise a lie, and make the public believe that if they pay me half-a-crown for a well-painted *carte* vignette they have a thing of beauty that will be a joy for ever (like my well-known celebrated best work!)

Now, Mr. "Peripatetic Photographer," haul down your flag, and come and take these lessons, and mind you bring some good cigars; also my taste is Glenlivet for preference.—I am, yours, &c., The F.C.S.

[We have also received a copy of the Liverpool newspaper cutting which elicited the strictures of the "Peripatetic Photographer," who, we are bound to say, has not been guilty of misquoting in the slightest degree. Of the identity of the "F.C.S." we were ignorant until we received the present letter. We shall be glad to receive an account of his new process "which removes all doubt as to the impossibility," or possibility, "of fading." We had hitherto believed that in carbon printing we were assured of immunity from fading, hence our desire to know more about the "new" process.—Eds.]

OXYGEN RETORTS.

To the Editors.

Gentlemen,—Having had my attention drawn to Mr. Chadwick's article on *A Novel Magic Lantern*, I beg to say that some four or five years ago I constructed one on exactly the same principle. Since then, and up to the time of disposing of my business at Oldham, I used it publicly throughout each winter, and although Oldham *is* seven miles from Manchester my entertainments were not always at that distance from the city.

I do not wish Mr. Chadwick to think I charge him with copying my lantern, though he may assure himself of the correctness of my statement by going to 24, Yorkshire-street, Oldham, where the original lamp is.

I may also say that I always used a pair of two and three-quarter diameter, four and a-half inches focus, Burr's lenses to my lantern, which gave an immense amount of light on the subject. Any photographer can get a good light at little cost by an extra flange to his quickest lens, fitting it to his lantern, and simply unscrewing his lens from the camera when wanted for lantern purposes. Any optician can make an extra flange at little cost.—I am, yours, &c., S. Beverley.

72, *Church-street, Blackpool, May* 21, 1878.

EXCHANGE COLUMN.

Wanted to exchange, one dozen 12 × 10 views of Yorkshire, all different and good prints, for Hearn's *Practical Printer*.—Address, EDGAR WILLIS, Park Villa, Scarborough.

I will exchange a cabinet rolling-press, nickel silver bed and roller, for cabinet Entrekin's burnisher. A little cash as difference if necessary.—Address, F. J. MATTHEWS, St. John's-road, Ryde.

Wanted to exchange, a pair of quick-acting *carte* portrait and view lenses, three and a-half inches focus, for an American Waltham lever watch, value about £4 10s.—Address, J. T., 64, Sherrington-road, Highfield, Sheffield.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED—

Archibald Burns, Edinburgh.—*Three Views of the Regalia of Scotland.*

John Horsburgh, Edinburgh.—*Two Portraits of Sam. Bough, R.S.A.*

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

B. G. SINCLAIR.—In our next.

ELECTRO.—Try either the electric or the magnesium lights.

J. S. SMITH.—Yes, certainly; but not for several months yet.

W. A. BRICE (Paris).—Received. You will hear from us soon.

R. M. HOWDEN.—Acetate of lead is a mordant for dyeing cloth by means of bichromate of potash.

G. F. (Leith).—If the lens be properly ground it will be sure to work well, as the principle is excellent.

SCHOLL.—Let the inside of the studio be painted a grey colour. Painting in this case is preferable to papering.

HALIFAX OPERATOR.—No great chances in Paris we fear, but you may write to our correspondent, enclosing stamps for his reply.

L. T. M.—The probable cause of the stains on the prints is the careless handling of the paper by some assistant whose fingers have not been clean.

M. P. E.—Try a solution of the persulphate of uranium; it will act better than the nitrate for your purpose. It may be obtained from several dealers.

A. J. CORRIE.—The print may be rendered transparent by means of a solution of Canada balsam in benzole, after which it is painted *behind* with the usual opaque artists' oil colours.

PYRO.—It is quite *possible* to take a transparency on a globe, but it is far from being easy, unless you are familiar with the transferring of films, by which process it must be effected.

M. (Kendal).—There is no book or manual devoted exclusively to photolithography. The process as usually and extensively worked is not patented, and you are quite at liberty to practise it.

AMATEUR.—So far as we have heard the morphia process, like a number of other processes that have been popular in their day, has ceased to exist. We have not heard of any one who now practises it.

OBLIGED READER.—The gentleman you name left this country several years ago, and now resides on the continent. He was in good health when we last heard from him, and is still a reader of this Journal.

L. S. D.—Your letter is far from being as explicit as it should have been; still from what has been stated we think the cause of the mottled skies is the over-iodising of the collodion. The coffee infusion has nothing whatever to do with it.

J. W. NICKLIN.—The print is not as good as the negative is capable of producing. Do not carry the toning quite so far; print in a weaker light, and pay a *little* more attention to the vignetting. Formulæ for varnishes will be found in our ALMANAC.

PHOTOLITHO.—The price of Colonel James's treatise on photolithography was about twelve shillings, but it is very doubtful if a copy can now be obtained except at second-hand bookshops. You may inquire at Longmans and Co., that being the firm by whom it was published.

W. (Budleigh, Salterton) and M. ROW.—We have written to the advertiser named without having received any reply. Of course neither Editors nor Publisher are responsible for statements made in the advertising columns. The matter has been placed in the hands of the Publisher.

S. A. H. P.—Arrange so as to have armholes in the sides of the developing-box, and have these fitted with short, wide sleeves having an india-rubber band round the wrist. This will allow of perfect freedom for manipulating without the danger of any light being admitted at the armholes.

L. G. BIGELOW.—A letter addressed to Mr. W. B. Woodbury, Manor House, South Norwood, London, S.E., will probably secure for you the information required. We regret that it is not in our power to give more details than we published in our ALMANAC for 1876, which we presume you have already seen.

MRS. S.—By the old hypo. toning bath most beautiful tones have been obtained, but such prints nearly always fade. We dare not say that *all* fade, because we have some at present in our possession in Talbot's *Pencil of Nature* that are still fresh and vigorous. We strongly recommend you to dispel your present ideas, and adopt alkaline toning exclusively.

F. B. (Dublin).—1. If you print your opal pictures by the carbon process you will have a guarantee that they will not fade. By adopting any of the other processes named fading is only a matter of time, such period being, in some instances, very short indeed.—2. A solution of sulphide of ammonium is necessary. Let it be diluted with three times its bulk of water.

J.—We cannot say whether or not you would be able to re-cement a lens yourself unless we know something of your capabilities. We have many times published directions for doing so. From your letter we arrive at the conclusion—perhaps an erroneous one—that yours is a case in which it would be much safer to secure the services of a properly-qualified optician, rather than make the attempt yourself.

E. O. P.—A triple achromatic lens of the usual form will not answer for portraiture in a studio unless in an exceedingly strong light; but special triple lenses having a central concave lens of large diameter are still to be met with—although not now manufactured—that admit sufficient light to render them suitable for portraiture. They do not, however, possess the rapidity of a properly-constructed portrait lens.

J. T. BAINBRIDGE (Barnard Castle).—Our correspondent writes to take exception to what Mr. Stothert has written respecting "vertical and horizontal lines." He says:—"It would be a waste of time to again discuss the question of 'the non-convergence of perpendiculars,' for anyone interested in the subject can in a very short time, by experiment, satisfy himself of the truth or untruth of what has appeared on this subject. I maintain that there is no such thing in nature as converging perpendiculars, and I should very much like to see a negative of a high building where the camera, being placed opposite and at an elevation of half the height of same, showed the vertical lines converging at the bottom as well as at the top. I, once for all, say that if the camera be properly levelled, there will be no converging either at the top or bottom, and no amount of arithmetic can alter it."

FADING OF CARBON PRINTS.—On this subject Dr. Monckhoven writes to the *Journal of the Photographic Society*:—"Allow me to give a short reply to the observations made upon my paper. 1. Not being very sure of my English, I wrote the word 'fading' instead of the word 'change.' In my opinion the carbon prints, as long as they contain black carbon, cannot fade. The red matter which enters prints alone can fade. I have been mistaken in the word, and cheerfully retract it. 2. It has been asked how I render the oxide of iron transparent. In this way:—I make a thick jelly and dissolve in it an equivalent of ammonio-citrate of iron. I make another jelly with an equivalent of ammonia, and mix the two. The ferric oxide thus formed in the syrupy liquid cannot precipitate, and, when poured upon a glass plate, is transparent. Prepared in any other manner it is opaque. I add it in this state to the gelatine which serves to make the tissue. 3. I have never said, as Mr. Swan makes me say, that I can make the ferric oxide purple. I produce organic combinations of oxide of iron of a brown-red colour, but never purple. 4. One journal says that I have operated with transfer paper prepared with barium sulphate, which will be altered by the chromic acid forming barium chromate, and that this is the cause of the alteration which I have observed in the prints. This is inexact. I have not employed such a transfer paper, and it is contrary to the most elementary ideas of chemistry to affirm that barium sulphate combines with chromic acid to form barium chromate. No acid, mineral or organic, attacks barium sulphate. I regret that such an argument should have been used. In conclusion: I may say that no one has given any experiments which clash with mine. It has been attempted to prove that the black prints are unalterable—a fact which I have never controverted. I have repeated all my experiments, and I energetically affirm that a simple washing of a carbon print, though it be prolonged for hours, will not eliminate the chromate nor fix the image; but that this object is attained by the addition of one quarter per cent. of sodium sulphite to the alum."

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For the two Weeks ending May 22, 1878.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

May.	Bar.	Wind.	Wet Bulb	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
9	29·88	E	52	54	67	49	Cloudy
10	29·84	E	55	59	72	51	Cloudy
11	29·60	E	53	57	71	54	Dull
13	29·58	SW	54	56	66	54	Dull
14	29·48	W	52	54	65	51	Cloudy
15	29·50	SW	52	55	63	52	Dull
16	29·82	SW	55	59	65	50	Cloudy
17	29·88	SW	59	61	69	56	Dull
18	29·74	S	60	62	75	58	Dull
20	29·88	NW	51	54	59	51	Dull
21	29·93	W	45	50	59	39	Cloudy
22	29·99	W	46	53	57	42	Bright

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ON THE CAUSES AFFECTING THE TRANSPARENCY OF DRY FILMS.

In considering the various causes which operate in modifying the apparent density of dry-plate films, we have to look at, first, the nature of the pyroxyline, and, second, the method by which the film is prepared, whether with the bath or with an emulsion. If the latter method be employed we have further to take into consideration the nature of the emulsion (whether washed, unwashed, or precipitated), the salt employed in sensitising, and the proportion of silver to soluble bromide. In addition to these causes the result is also more or less affected by the organifier (if any), some of the substances used in this capacity exerting a mechanical action upon the drying of the film of collodion without producing any apparent change while it is wet.

The difference caused by stronger or weaker salting scarcely belongs to this part of the subject, and in so far as it affects plates prepared with the bath it may be altogether dismissed; but its bearing upon emulsion films is worthy of a few remarks. In the old collodio-bromide process there was no inducement to carry the salting of the collodion beyond a certain point; in fact, in order to secure evenness of film and an easy flowing emulsion, it was absolutely necessary to keep the quantity of bromide within certain limits, varying slightly with the physical character of the collodion. But the introduction of washed emulsions, involving the evaporation and loss of considerable quantities of ether and alcohol, brought into vogue the practice of increasing the proportions not only of the bromide and silver employed in sensitising, but also of the pyroxyline contained in each ounce of solvents, in order to economise the latter as far as possible. Theory would seem to offer no objections to this course, but practically it was soon found that by pushing it too far the resulting emulsion suffered very palpable deterioration, not only in its working qualities, but the weight of the dried product fell far short of what should be obtained from the quantities of ingredients used.

In fact, it would seem that a point is reached beyond which it is injudicious to overload the solvents with solid matter, and that if the proportion of pyroxyline or of silver bromide be pushed beyond this point the resulting "pellicle" is sure to be inferior. The most noticeable feature in connection with a carefully-prepared emulsion, containing a moderate proportion of silver bromide, is the extreme fineness of the "grain" of the resulting film; but as we increase the quantity of solid matter in each ounce of solvents the appearance of the film gradually changes to a more granular and semi-opaque character. Nor is the change confined to its appearance; for, in proportion as the granularity increases, so does the image on development become less vigorous—more liable to fog as well as more difficult to intensify. We, therefore, counsel our readers to beware of false economy in this direction.

As regards the nature of the pyroxyline and its effect upon the physical character of the film, it may be accepted, as a general rule, irrespective of other conditions, that the more powdery the cotton the more opaque will be the sensitive layer when dried. In many instances the difference will not be noticeable until the film is dried; and in these cases other conditions—as the nature of the organifier—are capable of further modifying the result. In emulsion work, too, the nature of the cotton has an important influence upon the *formation* of the bromide, with some samples the emulsion remaining thin and transparent for hours or even days, in the presence of excess of silver, while with others half-an-hour or an hour suffices to bring it to the "creamy" or opaque stage.

This effect does not appear to be due to the powdery action of the cotton as produced by high-temperature acids, but rather to variations in the proportions of the latter and in their strength. We have obtained a dense, creamy film, in less than half-an-hour after sensitising, with a sample of pyroxyline made at as low a temperature as 135°, and which gave a collodion film almost as tough as gold-beaters' skin; on the other hand, a specimen of papyroxyline of so powdery a nature that it dried upon glass as a dusty, semi-opaque film, remained thin and transparent as an emulsion for several days after sensitising. This may be taken as the type of another variation brought about by the cotton. The emulsion itself and the film while in the wet state remain beautifully clear and transparent; but upon drying the latter assumes a dull, semi-opaque appearance, and under a magnifier of moderate power exhibits distinct traces of structure and granularity. This sort of pyroxyline is to be looked upon at least with suspicion; for, though on development an image of great density is easily obtained, it is completely ruined by the structural defects of the collodion. Emulsions which pass rapidly into the creamy stage are, on the contrary, inclined to give a feeble, veiled image, and unless containing a good body of sensitive matter are very difficult, if not impossible, to intensify.

The mode of preparation of the emulsion must also be considered in connection with the nature of the pyroxyline; for, though with a given sample of the latter a different character of film will be obtained according as the emulsion may be unwashed, washed, or precipitated, it is possible by changing the cotton to produce films of any desired characteristics by all three methods. As regards fineness of grain in the film the three methods may be ranged in the order they are named if the same conditions be observed in each case; and, though the results obtained by the two first mentioned are frequently difficult to distinguish, precipitation fails under any circumstance to produce an effect quite equal in quality.

As is now well known, the various soluble bromides used in the preparation of emulsions give widely different results as regards the appearance of the films. Zinc bromide is a notable instance of this, yielding as it does films of great density, while ammonium bromide leads to an opposite effect. It is sufficient to note this fact, which has been attributed to the action of the base of the bromide upon the sensitive compound, and possibly also upon the cotton itself. A greater or less degree of sensitiveness has also been attributed to emulsions prepared with different bromides; but whether any connection exists between the latter quality and the comparative density of the film we are not prepared to say. Certainly it would appear so, for the zinc salt, according to Mr. Warnerke's published researches, stands highest, and ammonium one of the lowest, upon the scale of sensitiveness.

Lastly: we come to the comparative effect produced by excess of silver and of soluble bromide respectively in the emulsion. A general opinion prevails that excess of silver is necessary to the formation of a dense, creamy film; and, while agreeing in the main with this view, we do not think the effect *invariably* follows the cause, or that it is impossible to produce a creamy (by which we mean a semi-opaque) film with bromide in excess. With a considerable excess of the latter—say two or three grains to the ounce—it is possible to retain an emulsion for many months in the transparent stage; but if the proportions be so nearly balanced as to leave but a mere trace of bromide unconverted, a few weeks, or even days, suffice to change the character of the emulsion and its working properties. Similarly a slight excess of silver brings on the creamy stage in a few hours; but if the quantity be increased to six or seven grains per ounce over and above the combining equivalent the emulsion will remain in a comparatively transparent state long after it has passed into a hopelessly foggy condition.

It seems probable that the solvent action of the excess (whether it be on one side or the other) upon the silver bromide already formed in the emulsion has something to do with the transparency or opacity of the film, and that an emulsion in which the salts are nearly balanced is in the most favourable condition to pass into the creamy state, that result being produced, not by the free silver, but by the action of the decomposition salts and the free acid. In proof of this a washed emulsion giving a thin, transparent film was treated with silver nitrate and potassic nitrate in separate portions—the former being added in the proportion of two grains to the ounce, the latter eight grains, or approximately the quantity which would be formed by double decomposition in sensitising. The result was that both emulsions soon became unworkable; but, whereas the appearance of the first remained unchanged for several days, the other gradually became opaque and granular. The first also was restored to working condition by treatment with cupric chloride; the latter was hopelessly ruined.

Having enumerated the principal causes which affect the physical character of the dried film, we may conclude by stating that an extended experience with different descriptions of plates, and during the last two or three years numerous comparative experiments with emulsions, have induced us to give a decided preference to moderately transparent films. A certain amount of opacity has its advantages; but where it is gained by modifications of the structural qualities of the film, or by the production of a coarse formation of the silver bromide, the advantage, if any, is more than counterbalanced by the loss in working qualities. A dense layer of fine particles of bromide, when it can be obtained concurrently with uniformity of coating, is obviously superior to a thinner film of coarser and more opaque particles.

TYPICAL PHOTOGRAPHS.

When, a few weeks ago, Mr. Francis Galton, F.R.S., President of the Anthropological Section of the British Association, explained to us his method of taking, or rather of *making*, composite portraits we thought the scheme was one much more likely to lead to failure than success. He has, however, made good his intentions, and, in a paper submitted to the Anthropological Institute, he has not only described his *modus operandi* in every detail, but has exhibited numerous specimens of this decided novelty in photographic portraiture. Mr. Galton has kindly favoured us with a set of these specimens, which possess great interest.

The joke of "three men rolled into one" is a standing one. But we have before us not only *three*, but *four*, *seven*, and even *eight* persons in one. The effect of these can easily be seen by taking two or three negatives of different individuals all posed and lighted alike, and placed at the same distance from the camera. From these let very thin transparencies be printed and overlapped, in the manner adopted by M. Leon Vidal when he first produced his polychromatic pictures. One face will then be blended with another, the result being the average of both.

It is a very easy matter for those who have acquired the art of seeing a pair of binocular pictures as one, without the aid of a stereoscope, to combine a pair of portraits of different individuals by placing these portraits side by side and causing them to unite in the brain; and it was long ago suggested that by forming in this way a "composite" of a husband and wife some idea of the physiognomical peculiarities of their children might be obtained. Experience has not, however, shown that much reliance is to be placed upon such a means of forecasting the appearance of the coming children, although there is no doubt that it has proved correct in some instances.

A photographer, from his being intimately conversant with the technical requirements of his art, will naturally arrive at the conclusion that a "composite" picture must prove to be a confused, blurred mass, in which it will be wellnigh impossible to trace a feature. This is not the case. One of the "composites" given to us by Mr. Galton, and which is made up out of three components, possesses in the face the degree of sharpness peculiar to a portrait printed, not from a collodion negative, but from a paper or Talbotype negative, there being certain peculiarities of dress which convey the threefold origin of the picture. No one feature in this special "composite" appears identical with that of any one of its components; but it contains a resemblance to all, and is not more like to one of them than to another. Those of our readers who are interested in anthropological subjects will read Mr. Galton's paper in another page with much pleasure.

ARTISTIC "KEEPING."

It is not a long time ago when the perfection of a landscape photograph was, by the majority of workers, considered as obtained when every object depicted was given with hard and rigid exactitude, being, as it was termed, in "sharp focus all over," and the whole capped by a perfectly white "sky," free from spot or stain or the slightest irregularity that might suggest cloud possibilities. And when this phase was past, and the printing-in of clouds became a recognised part of the routine of first-class work, much was the merriment often caused among the critics by the haphazard way in which a cloud picture was tumbled on to the top of the landscape, without any regard being paid to artistic keeping or natural possibilities.

Afterwards, when the so-called composition pictures became more popular it was rare that one or other of them did not transgress some of the most elementary canons of propriety. Thus, as a minor example in a picture of great merit in this class, which was shown at one of the exhibitions, clouds were introduced the lighting of which proved the sun to be at a point exactly opposite to that required by the illumination of the figure subjects in the same picture.

Photographers, however, in their turn have now an opportunity, if they wish, of rejoicing over—we can scarcely say their rivals—the artists of the brush, who are so chary of admitting them to be workers in fine art. Mr. Norman Lockyer's paper, in *Nature*, entitled *Physical Science for Artists*, has shown how easy it is to overpass the boundary line which separates possibilities and artistic imagination and as his remarks possess an interest for photographers equally as well as for artists of the brush, we have taken the present opportunity of calling attention to them. Commencing with an impeachment against the skies of a number of pictures, he points out how they are contrary to nature, and would be impossible of realisation owing to certain unchangeable physical laws. For example: moonlight effects have often been tried in photography with but indifferent results, the heaviness of the sky generally being so conspicuous; but of one of the pictures in the present Academy exhibition Mr. Lockyer feels compelled to speak very slightingly—"unnatural moonlight, and impossible shadows." The softness and colour show that the artist had never studied "moonlight." Of other pictures he speaks of "brickdust beams of light proceeding from nothing, unnatural sunset colour, and distribution of light wrong, interesting as a foretaste of the future when the sun shall have cooled," and so on. We thus see that if photographers err they do it in good company; but that we hold to be no excuse at all. Photography ought now to be quite able to hold its own, and its professors to point to results in double or combination printing which should be beyond cavil.

Subjects including reflections in water are favourite ones for those who produce these pictures, and such are the kind in which usually we may see natural laws set at defiance in the representations of reflected objects. Mr. Lockyer has presented the question of reflections in such a popularly understandable form that we here make an extract in his own words. He has tried to show how the actions involved in sending a telegraphic message may help us to form a mental image of what is going on before the sensations of light is produced:—"We have a sending instrument, a medium, and a receiving instrument. The first under all circumstances is a molecule or series of molecules in vibration, and the quality of the light depends upon the vibration either inherent in the molecule or dependent upon the quality of the energy which sets it in vibration or controls the vibration. The second is the ether, which does for light what an atmosphere does for sound. Competent to transmit vibrations of all lengths without loss of energy, it behaves with perfect fairness, so to speak, to light of all kinds. The third, the receiving instrument, in our case is the eye of the artist above all things, but not to the exclusion of everything else, because every object which reflects light must receive it first, and sometimes important modifications are brought about in the act of reflection."

Further on Mr. Lockyer says, with great cogency, for photographers "the laws of reflection can also be studied without any higher knowledge of the properties of light, and the difference between 'specular reflection,' the case in which light is reflected as in a mirror, and 'scattering,' in which in consequence of the roughness of the surface on which it falls it is thrown off in all directions, will be at once recognised." The great stumbling-block, as we have pointed out, is the proper mode of representing objects as seen by reflection in the water; and here we feel compelled again to quote, for better chosen language could not be employed to embody the scientific principles necessary to guide the printer when he wishes to produce from a reversed negative a reflection in water of any portion of his picture, this being a point of great difficulty to do correctly:—

"If a painter will imagine a vertical plain passing through the object reflected—say a hill top—and his eye, and plot a section with the height of his eye and the hill top above the water and the distance between them roughly to scale; and, if he will further recollect that the lines which connect the reflecting point of the water with his eye and the hill top must make equal angles with the water level, he will find all he needs to ensure correctness."

Similar reasoning shows us how relatively to place a moon or sun to obtain the beautiful rippling water which shows so prettily in a picture; the fact that artists of eminence have sinned by placing this wake across the picture, in positions it could never take in nature, is pointed out in the same place.

Any effective natural rainbow is very seldom shown in a photograph, but there is no reason why a factitious one should not be introduced with considerable effect by a little dodging in printing; but care must be taken that the cast shadows be in proper keeping with the position of the rainbow. An otherwise beautiful Constable, which we noticed in the last Grosvenor Gallery exhibition, was marred by such a physical absurdity as the shadows being cast almost across an imaginary line at right angles to the centre of the bow. In photography, void of colour as it is, the opportunities of producing pictures deficient in truth to natural requirements are comparatively rare; but on that very account, and from the reputation it has for exactitude and accuracy, it behoves every one who in the slightest degree introduces, by double printing or otherwise, a representation of what is not in its due place in the field of view at the time of taking the negative to be as careful, conscientious, and accurate as possible, or the results obtained would become gross absurdities on account of their very ambitiousness.

The introduction of studio backgrounds has fallen into utter disgrace from this very cause of want of proper keeping, though we have been pleased to note that for some time painted screens of the highest merit have been placed in the market, and they leave so little to be desired, from an artistic point of view, that it is likely a reaction may set in.

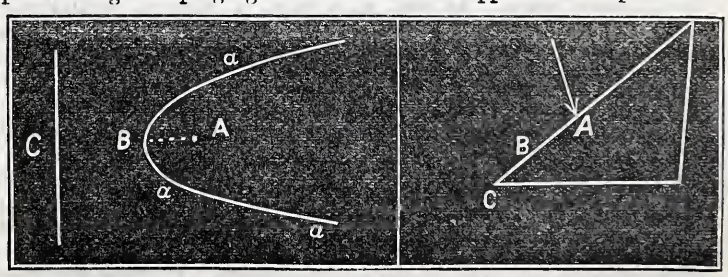
At a meeting of the Society of Arts, last week, there was, in connection with a Water Conference that was being held, an exhibition of numerous appliances of the most modern and improved description having a bearing on the object of the conference. At this exhibition we observed, among other things, a simple piece of apparatus which bore the designation "The *Indispensable* Patent Double-Acting Filter," and in the belief that it will prove very useful to photographers we give the following account of it. Although exhibited by Mr. James Sinclair, 104, Leadenhall-street, it is designed and patented by a foreign firm—Berlon, Frustenhagen, and Wildt. It consists of a metallic attachment to the nozzle of any water tap, so constructed as, by means of a two-way plug, either to allow the water to run straight away from the orifice of the tap, *unfiltered*, or to pass first through a cylinder made of pewter and closely packed with felt from top to bottom. As this cylinder is three inches in length, with an emission aperture at its lower end, it is obvious that the water which passes through such a thickness or length of felt must be indeed thoroughly well filtered and set free from every kind of mechanical impurity; even the most infinitesimal animalculæ would find it a hard matter to wriggle their way through such a formidable barrier to the transmission of anything but the most limpid fluid.

BLURRING, SOLARISATION, AND REDUCTION OF THE PHOTOGRAPHIC IMAGE.

I have just read Mr. L. Warnerke's communication to the Photographic Society of France, published in your last number, and think it right to offer a few remarks on it, as it is likely to cause a misconception of the easy explanation of certain phenomena. Your short sub-leader on the subject is much to the point, and in it you adopt the explanation of blurring, to which, I believe, I was the first to call attention in the *Philosophical Magazine*, namely, that the particles of the silver compound scatter the rays, and the kind of rays scattered depend much upon the fineness of these particles. If Mr. Warnerke had used a turbid glass the diagram showing the reflection from a minute particle in it would have been correct, but could not in any way account for the *halo* seen round the images.

The standard case of irradiation may be taken to be a ray of light such as that coming through a pinhole impinging on the film, in which case we have, on development, a black dot with a well-defined ring round it. If we measure from the centre of the black dot to the nearest blackest edge of the ring, and also the thickness of the plate, we shall find that the latter corresponds exactly to the rays striking at the angle of total reflection, or "critical angle," of the glass used. Mr. Warnerke's explanation would never account for the ring, whereas the theoretical explanation does. Other instances of the forms of halos given by small triangles, squares, crosses, &c., cut out in black paper and placed upon a film, which is then exposed to the action of light, are very readily explained by carrying out the argument derived from this last experiment. If I may be allowed to refer Mr. Warnerke to my article in the *Philosophical Magazine*, which also appeared in The British Journal of Photography, I think he or anyone else will see that there is no necessity to propound a new theory for the turbidity of glass, which palpably to the eye is transparent, whilst we have a much more turbid film to deal with.

Now, regarding Mr. Warnerke's prism experiments: I am at a loss to understand them. He states that he gets the same halations, and, therefore, presumably, the same definite figures, when he used a prism instead of a plain glass plate! Now this is contrary to all my experience. The following is a diagram of what I get when using a pinhole point of light impinging on the film when supported on a prism:—



The figure is an hyperbola, which should be the case mathematically. a a a is the locus of the darkest parts of the halo surrounding the point A. The nearer A is to C, the edge of the prism, the shorter B A becomes; in other words, the focal distance alters, as it would do theoretically, supposing the light to be scattered by the silver film. Unless Mr. Warnerke's prism is of most extraordinary material I doubt very much if he ever gets a circle surrounding his points. It may be an ellipse, and the ratio of the major and the minor axes entirely depends on the angle of the prism. I may briefly state that the figures the halo will assume will be—first, a circle if the two surfaces of the glass be parallel; an ellipse when the critical angle is greater than the angle made by the two surfaces; an parabola when it is the complement of the angle; and an hyperbola when it is less than the angle made by the two surfaces. The second and fourth were the cases experimented with.

Now anyone may try for himself what figure he will get without the trouble of photographing it. Take a short-focussed lens—say a couple of inches in focal length—and let him make a little cardboard box and put the lens in the front, and at the back place the prism, the surface coated with the film being placed in the position of the sensitive plate; take out the top of the box, and turn the lens towards the sun so as to cast an image of the sun on the prism. On examination through the top of the box an hyperbola or ellipse of light will be seen to surround the image of the sun. Blacken the opposing surface and the figure at once disappears. The explanation given by Mr. Warnerke fails in this case as well. Should anyone wish to test what effect turbid glass has on an image let him try it on opal and he will see how totally different it is.

Now as to the theory of solarisation propounded in the same paper: it is ingenious, but hardly answers to general facts, though it apparently does in the particular case mentioned. Solarisation takes place in the presence of free silver nitrate. How can this salt exist in the presence of liberated bromine without combining with it, and forming silver bromide and bromate? If a plate be exposed to the action of light when absolutely *immersed* in a solution of silver nitrate solarisation takes place. This explanation can hardly hold; but in connection with my late researches I can offer a perfect reason for the phenomenon without leaving free bromine in the silver. It would be too long to refer to here, but I shall have something to say about it at a future date.

In one paragraph Mr. Warnerke describes coating a silvered plate with emulsion and noticing that bromine had been absorbed by the metallic silver on exposure of the film to light, and makes a deduction therefrom, which is—"Thus, supported by this fact, I am authorised in saying that solarisation proves by the evidence here given that the cause which has produced the invisible image is purely chemical." Now this very experiment was originated by M. Poitevin ten or twelve years ago, and he gave this as a proof that the chemical theory of the photographic (I prefer not to call it latent) image was correct. This experiment I repeated and quoted two years ago in a lecture at South Kensington, and have referred to it since. This seems to me not to prove solarisation to be due to the liberated bromide, but seems rather to point to another direction. I throw out as a hint that it is hard to produce solarisation when any impurity is to be found in contact with the silver salt, be the impurity a preservative or india-rubber.

In Mr. H. B. Berkeley's communication we have other ground broken, and there are one or two points in it on which I may comment. As regards the red and ultra-red rays being termed "continuating rays," and yet accelerators of oxidising action, there is no anomaly in the two cases. I have no doubt, from experimental proof, that the continuating action which Becquerel and Claudet noticed when red or orange light was allowed to act on silver iodide was really and truly an oxidising action, and that this action only took place where actinic light had previously altered the sensitive salt in composition, and in absorptive properties for light; and, as I have already pointed out in my paper read before the Photographic Society of Great Britain, the reversing action and probably solarisation are due to the same cause. In that same paper I tried to explain how a minute quantity of silver salt which had been altered by light formed a nucleus on to which the bromide could be reduced; and the difficulty Mr. Berkeley mentions seems to be done away with. We are all aware that in the case of what is called "over-exposure" the half-tones are developed by the alkaline method right through the film, as are the highest lights; and the point of exposure seems to be sufficient when the sensitive salt nearest the back of the plate is affected by the highest lights, and the half-lights to not such a great extent. Recent experiment seems to show that silver bromide cannot exist as such in *absolute contact* with metallic silver, but becomes the dark-coloured sub-bromide. If, then, the altered molecule of silver bromide be reduced to the metallic state, the next molecule combines with it to form sub-bromide. Thus—

Original sub-bromide gives silver and bromine absorbed by the developer.

$$Ag_2\,Br \quad = \quad Ag_2 \quad + \quad Br$$

Silver and silver bromide give two equivalents of sub-bromide.

$$Ag_2 \quad + \quad Ag_2\,Br_2 \quad = \quad 2\,Ag_2\,Br.$$

This new sub-bromide is immediately amenable to development. The *particles* of sub-bromide, be it remembered, are not molecules but a group of molecules, and a microscopic examination shows that each particle may be somewhere about $\frac{1}{30,000}$th of an inch in diameter. Such a particle may be entirely reduced and yet not be in such close contact with a neighbouring particle as to cause its reduction. And since alteration in the composition of a sensitive molecule requires the expenditure of a certain amount of work, it is obvious that the length of exposure and intensity of light, after passing through a certain thickness of the film, may be insufficient to cause the necessary change in every molecule of the particle beyond that thickness; hence we have the development of all degrees of intensity of light.

Mr. Berkeley asks why (if this action take place in every direction) it is that a church spire, provided there be no halation, occupies the same space in the negative as it does on the focussing-screen. My answer to this is that it does not, for reasons stated above. Even if the lens be perfect, there must, however, always be *as much* lateral halation as the thickness of the film (if the particular part be developed right through the film). The thickness of the film varies. It is certainly less than $\frac{1}{100}$th of an inch; hence, except for very accurate measurements, it escapes detection. If we have a particle of bromide $\frac{1}{30,000}$th of an inch in diameter, and a ray of light of the same diameter or less impinging on it, it is quite possible that only that particle would be reduced and no other adjacent to it, provided there was no scattering of the ray.

My communication is already too long, but I shall hope at another time to explain those experiments by Herr Vogel quoted by Mr. Berkeley.

W. DE W. ABNEY, F.R.S.,
Capt. R.E.

STEREOSCOPIC TRANSPARENCY PRINTING.

MR. BREESE'S METHOD.—No. II.

As only a few of the main points of the copying camera were treated of in a former communication, the substance of the description of this piece of apparatus given there is again brought forward on which to base a more detailed account.

Stated generally, this instrument consists of two boxes dead-blackened on the inside, viz., one to exclude all light between its front, which carries the negative, and its back, through the apertures in which the lenses are pushed; the other one performs the same office between the lenses and sensitive plate. Both of these require to be partitioned down their centres to confine the light transmitted through each half of a stereoscopic negative to its own compartment. They must also have telescopic or bellows bodies to enable the variations of length necessary for the slight enlargement or reduction of the picture sometimes desirable to be conveniently made. If a pair of double-combination lenses of about four or four and a-half inches focus be employed and the transparency be slightly reduced, as is generally the case in copying the negatives of the usual stereo. size, the length from back to front of the first box, when half expanded, may be about ten inches, and that of the latter, or camera proper, having the fittings for lenses and dark slide, under like conditions, about nine inches. Provision must be made in the negative's carrier for its motion both horizontally and obliquely—for the latter the kind to be obtained being similar to that from a parallel rule opened out, to hold the negative between its two portions, each one of which is fastened in the same perpendicular on the front of the box by a screw passed through the middle of its length. A framework constructed and secured in this manner affords a ready means for making the slightest alteration for the purpose of bringing any two corresponding objects in each half of the slide into the same horizontal position. The apertures at the back of the box fitted with this arrangement must be of sufficient size to allow the movements of the lenses described further on to be made freely. The front of the other box mounts the lenses, and requires, besides a rising motion of the usual description, a means for separating or approaching them. One of the best methods of accomplishing this is by having a right- and left-handed pitched screw—not in one piece, as usually supplied, but divided and keyed together in the middle, a little plug being provided for in the longitudinal direction of the joint, so that the slight fluctuation in its length resulting from variations of temperature may not disturb the position of the fronts to which it is attached. Each thread of the screw passes through its respective nut fastened one on each portion of the separating front, the length of that end of the shaft terminating in a milled head being sufficient to project from the side of the camera within easy reach of the hand. This kind of screw, as its name implies, gives motion to the two pieces in opposite directions at the same time, and is susceptible of fine adjustment.

The object of having the screw divided and keyed together is this:—During a hot summer's day, or, in fact, any day, the temperature rises to a maximum and then gradually falls. A delicate adjustment made in the morning, such as a moon placed at its proper distance in the apparent space of the stereoscopic picture, with the screw shaft in one piece, will, as the temperature increases, expand the metal and separate the lenses, the moon from this cause having the effect of making a retreat into the star depths. On the other hand, if the fixing in position is performed when the temperature is highest, the moon's motion, as that falls, is reversed, appearing to come forward into the region of the earth's atmosphere. When a whole day has been spent in printing from one negative required for the combination effect of a subject—fifty copies, perhaps, being made—there will be a serious expenditure of time and labour in cutting the plates asunder and in fixing them in position when superposed on other portions of the picture, the operation needing to be constantly viewed through the stereoscope during its performance. Through the employment of a screw of this kind Mr. Breese experienced much annoyance, the cause of which he had not detected up to the time I parted company with him. Mr. Oakes will probably recollect that the camera he saw him use was fitted up with this disregard for thermal variations, it being so when it was handed over to Mr. Breese.

When these portions of the copying camera have been completed they will have to be mounted on a board or table behind each other, the fore part of the first one described being made a fixture, the latter fitted between guides through which it can easily slide to or from the former one, a separation of about three inches being always preserved, the lenses requiring that space to make them accessible for operations with diaphragms and the rackwork motion upon them. A wooden cover, constructed of sufficient length to project beyond the negative to shield it from oblique rays without obstructing the necessary light by shading the reflector, and the opposite end not extending quite to the aperature for the dark slide, can be hinged along one of its sides to the table, will be found very convenient and useful in protecting the camera from dust, light, and heat.

To the front of the table may be hinged, or otherwise conveniently fastened at an angle of about 45°, a reflector of the kind I have before indicated. A very good plan to follow in making one is to have a slight frame of wood grooved round its inner edge; this clamped down to a piece of glass serves as a mould, into which pour the following mixture:—Break up all lumps and finely sift a sufficient quantity of plaster of Paris, which has been previously coloured a faint sky blue with powdered French ultramarine; mix this up with water coloured with sufficient of Judson's magenta dye to strike a violet tint when the proper quantity has been added, and work the whole into a smooth paste of about the consistency of cream. As different samples of plaster vary in the degrees of yellowness to be neutralised, a definite formula cannot be given. Fill up the mould, smooth off the surplus with a straight edge, and allow to set for an hour or two, when the slab and its frame may be unclamped from the glass and stood up in a warm room to dry. The whole operation of mixing should be performed as quickly as possible, as the plaster soon sets and becomes unmanageable. The frame is to be left on, being of value in giving strength to the slab, which firmly holds into the grooves provided for the purpose. When dry the glossy surface must be removed by rubbing with glass paper, the result being a beautiful matt surface of pearly whiteness, its actinic value exceeding by many times that of cardboard and white paper so often recommended. The surface, as it becomes dirty, can be removed by glass papering, which may be repeated, when necessary, till only a mere shell of plaster remains.

Having had three or four years' experience as a retoucher, I feel some confidence in recommending the use of the above reflector to the notice of my fellow-brethren in that craft. I have found that the printing value of retouching, either with colour or lead, is, provided the colour be matched in tint with that of the negative, the same as it appears to the eye upon the negative when viewed with light reflected through from a white matt surface. Such is not the case when a mirror, ground glass, or the like is used, the retouching having to be made much heavier with these to give the negative a finished appearance to the eye when so viewed—the consequence being that nearly every touch stops back too much light, and renders touching on the print a necessity. The easy and economical means for always ensuring a clean surface, combined with its other advantages, has induced me to digress from the particular subject I have in hand to make these observations, which, I hope, will be justified by being of some benefit to the fraternity.

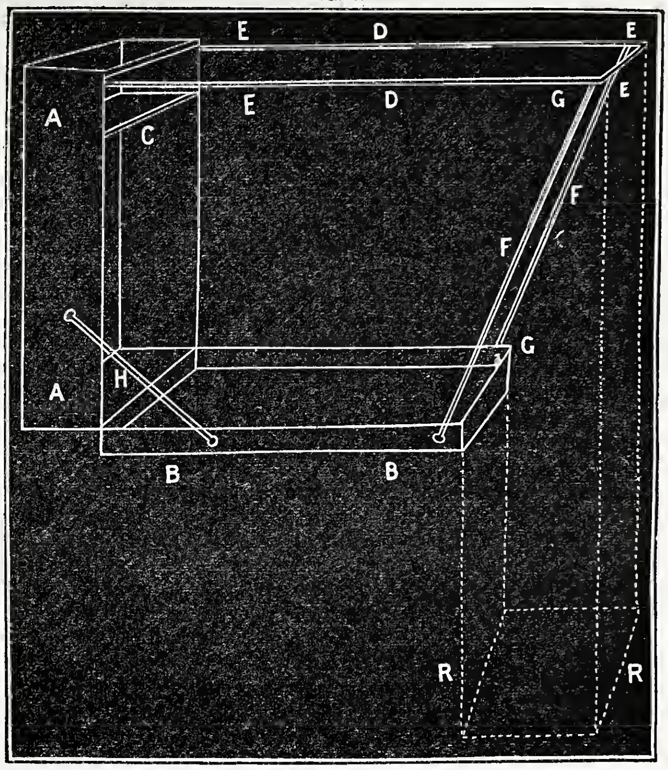
To return: when a negative is very dense or a very powerful light is required to produce any special effect, recourse must be had to a heliostat, or, as a substitute, such a primitive one as may be supplied in directing by hand the reflected sunlight from one or more mirrors, as needed, through a piece of ground glass fitted into the side light of the studio, care being taken that the camera be some distance away, so that no element of coarseness may be introduced into the transparency by bringing the grain of the glass into focus when a small stop is made use of. The same applies for any reflector possessing grain or marks of any description whereby the light is irregularly reflected.

John Harmer.

MY DARK TENT.

Fig. 1 represents the tent open but without the cover, which is made of black twill; *fig.* 2 is the tent closed; *fig.* 3 is the end of the interior, showing window and pockets for bottles.

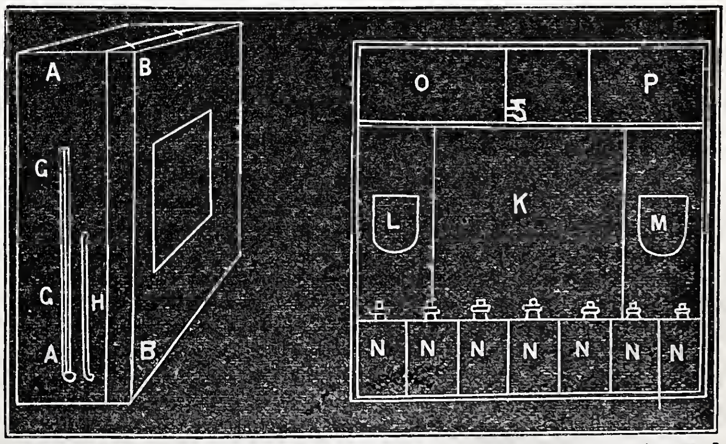
FIG. 1.



The tent consists of two trays AA and BB, one of them being 24 × 24 × 6 inches, and the other 24 × 24 × 3 inches, hinged together so as to form a box. They should be made of half-inch deal. The largest one should have a hole one foot square cut out of the bottom, which, when covered with yellow calico, forms a window. C is a shelf to hold water tank.

EE is a light wooden framework which, being hinged at D, folds into AA; it is supported by GG, which are hinged at F and fold so as to lie on each side of BB. On this framework is suspended a

FIG. 2. FIG. 3.



cover of twill that hangs down to RR, and being there wound round the operator's legs keeps out all light except that which enters through the window K. The two trays are kept at right angles by a hook H.

In *fig.* 3 L M are pockets for extras; N N N N N N N are seven pockets for bottles; O is a tank for water into which the plate-box fits; and P is the bath.

This tent, when closed, will contain a half-plate camera and bath, &c., and measures 24 × 24 × 9 inches. It is kept closed by two hooks-and-eyes. A. A. Campbell Swinton.

PHOTOGRAPHY AT THE LEAST REFRANGIBLE END OF THE SPECTRUM, AND ON SOME PHOTOGRAPHIC PHENOMENA.*

I now come to the second part of the subject which I have to bring before the Society, and I have brought it forward as it has an intimate bearing on the success of red end photography—so much so that I am in hopes of obtaining results in a much more expeditious manner than I have done at present, as soon as my new apparatus is fitted up. It will be remembered that I brought before the Society last year a paper on the destruction of the photographic image by means of various oxidising agencies, and I concluded a communication to the *Philosophical Magazine* by stating that if the red rays should prove to be accelerators of oxidising action, that then we should have an explanation of the reversing action of the red rays as explained by Draper, and probably also an explanation of photography in natural colours as shown by Becquerel and Niepce de St. Victor. Into the latter I do not wish to enter tonight, as my investigations are incomplete, though I may say I have succeeded in producing the spectrum in its natural colours by similar means in a very short time. I have already announced at the Royal Society that I find the red rays and ultra-red rays are accelerators of oxidation. I will briefly give an outline of the experiments carried out. Plates were prepared with what I will call red end emulsion and exposed to diffused light for two or three seconds, and then immersed in one or other of the following oxidising solutions:—Potassium permanganate, potassium bichromate, nitric acid or hydroxyl.

The solutions were very weak indeed. Take, for example, nitric acid—five or six drops of concentrated nitric acid in four ounces of water. Whilst thus immersed the plate was exposed to the action of the spectrum for about seven minutes, when on development it was found that the red rays had not only stopped the reducing action of the light, but had cleared away the fog from the plates where the red light had acted, leaving the Fraunhofer lines as opaque lines on a transparent background, instead of transparent lines on an opaque background. Such a photograph I now show. To test the matter further, it occurred to me that if the solutions were further diluted, the oxidising action ought to be more balanced by the reducing action, both being at work at the same time. This proved to be the case. The photograph now shown was obtained under precisely similar circumstances, with the single exception that the oxidising solution was reduced to half the strength. Iodide and bromo-iodide of silver films behaved in precisely the same way. These were washed first, then exposed in the solution, and developed with pyrogallic acid and silver. By a singular mistake a plate of bromo-iodide of silver was placed outside the cell next the spectrum, instead of in the cell and exposed to the spectrum; in this case *the same results were obtained*, showing that in a film on which the red rays have no reducing effect the oxidising action is effective, even where no special means are taken to help the oxidation.

I wish you to note, however, that this last experiment, when combined with the fact that, at will, on a film of silver bromide, a reversed or non-reversed negative can be obtained, shows that, in all photography of the rays of low refrangibility, we have a powerful oxidising accelerator to contend with; and, further, that unless the sensitive salt employed be one in which the reducing action more than counterbalances the oxidising action of the oxygen in the air, together with its acceleration by the red rays, a non-reversed negative of this portion of the spectrum is impossible. This being so, it is obvious that, if you exclude all oxygen, the negative should be obtained more readily. This is what I am at present trying, and shall be able to speak more authoritatively on the matter on a future occasion. I may point out, however, that this at once explains the insensitiveness of the bath process with silver bromide for the red rays, the presence of nitric acid being necessary to obtain freedom from fog. By saying that red rays are accelerators of oxidation I do not mean to say that the other rays, such as the blue, are not equally so—in fact, they are; but their reducing action is far greater than their acceleration of oxidisation. If, however, all the silver salt accessible to the light (of which there is not a very large proportion in comparison with the volume employed) be reduced, then the oxidising action at once takes place and the image is destroyed, and we get what is known as solarisation—a phenomenon well known. Here I have a photograph of a spectrum, in which the oxidising action takes place in the blue as well as in the red. There is one experiment I have seen noted in Hunt's *Researches on Light* which bears upon this subject. Hunt exposed silver chloride in the closed end of a bent tube to light, the other end dipping in water. He remarked that, after some days' exposure to light, the water rose in the tube. From this he inferred that, since the water would absorb the chlorine, the altered silver chloride must absorb oxygen; and so it did, but the experiment was not followed out. Now, it may be said, how do you know that oxidation takes place? Well, a simple experiment will show. Take a film of silver bromide and expose it to light till it darkens all over, and then drop on it a little peroxide of hydrogen, potassium bichromate, or permanganate, and let the drops remain on a short time, and then wash the film; there will appear to be but very little alteration in the colour, if any. Pour over it sodium hyposulphite, and it will be seen that, where the drops have rested, the film is quite clean and bright, whereas over the rest of the plate is a very thin film of (presumably) silver.

I could detail other experiments, but I am afraid I shall weary you out, so I now conclude, with a hope that what I have detailed may be of interest not only to this Society but to the scientific community at large. I must acknowledge the great assistance I have received in these later researches from Corporal Davenport, R.E., without whose aid my experiments must have been more prolonged than they have been. W. de W. Abney, F.R.S., *Capt. R.E.*

* Concluded from page 244.

TRANSATLANTIC NOTES.

Knowing that the readers of The British Journal of Photography are, from reports of American societies and original articles, tolerably conversant with the state of the art in the larger cities, I have, whenever possible, tried to ascertain rather what is being done in the smaller towns and villages. This is more easily accomplished here than in the "old world," as railway tickets are good for any length of time, and the journey may be broken at any or every station on the route.

My last letter was closed in Waverley, at which I was induced to stop for a few hours. Like almost all the villages which have recently sprung up in the country it is indeed beautiful. Waverley may be taken as a type of hundreds of villages that have within the past few years been called into existence, and therefore I may describe it in a few words. The junction of two railways, two rivers, or other modes of conveyance is generally a place where men are found to congregate. Business or pleasure—but in this country more frequently the former—keep them ever on the move, and a junction generally implies waiting, and waiting necessitates a hotel, a hotel full of visitors attracts the attention of some of the shopkeeping community, and so the foundation of a village is laid.

Waverley is beautifully situated on the southern border of the State of New York, close to the Pennsylvania boundary, in the charming Susquehanna Valley, at the junction of the Susquehanna and other beautiful rivers and several lines of railway. It consists of one principal street of about half-a-mile in length, with two hotels in the centre, and lesser streets at right angles to it. The former is entirely devoted to business purposes, having stores from end to end—some of brick and some of wood, and quite as varied in their architectural features as in their contents. The latter contain the dwelling-houses of the storekeepers and other residents, and are at this season lovely beyond what those who know only the prosaic villages of the old country can conceive. The streets are not less than eighty feet in width, with clean-kept wooden side walks that are always dry, and lined on either side by rows of the charming and rapid-growing maple trees, which give, even in the hottest days of an American summer, a shade so delightful as to make walking pleasant. The houses are in most cases of wood, each standing in the centre of a garden, locally called a yard, and generally surrounded by maples, elms, pines, &c. Of course the term "wooden house" conveys the idea of something comfortable enough, perhaps, but altogether deficient in beauty from an architectural point of view; but this is a mistaken idea, as wood lends itself more readily, and at much less cost, to the vagaries of the architect than either brick or stone. In most of the American villages the visitor has no difficulty in finding exquisitely-beautiful examples of all the popular styles, from the earliest "Gothic" down to the most modern "mixed." Then, too, their beauty is enhanced by the fact that they are not much seen till the spectator is right in front, when they burst upon his view in all their loveliness, as on standing at the end of a street and looking along it appears just as a beautifully-shaded lane. Such houses are mostly the property of the occupiers, Americans generally preferring to build or purchase rather than rent their houses, and equally generally finding the means of doing so. But, of course, there are exceptions, and they must be profitable to landlords. Lumber is cheap, and such houses, consequently, cost much less than equal accommodation in stone or brick, yet the average rent is fifteen dollars per month, or nearly forty pounds per annum.

Such are Waverley, Owega, Binghampton, Athens, Ulster, &c., &c., beautiful as Paradise, and inhabited by a people keen in the pursuit of business during business hours. Sober, so far as an outsider can see, as if distillation had not been discovered; and, consequently, as far removed from poverty as the Seven Dials from St. James's.

But, of course, this is not photography, and I suppose that is what my readers wish especially to hear about; and, therefore, for their sakes, I am sorry that there is little to be said regarding it. Photographers are there in plenty, and in most cases a tolerably good trade is being carried on. I write "trade" advisedly, as, with very few exceptions, the work done is destitute of every vestige of art—inferior, indeed, to most of that to be found in the out-of-the-way villages of the old country.

An American photographer rarely speaks of his "studio" or "glass house," but almost always of his "skylight;" and in most cases the name is well applied, as the light is in nearly every case a top light only, with a very steep pitch, a large expanse of glass, frequently covered with tissue paper, rarely curtained, and when so only with thin white cotton—shadows being got, when got at all, by the use of hood, or rather stand, screens. In a word, the great mass of pictures made in such towns as I have named are simply patches of white and black, without any pretension to the delicate gradation or variety of middle tint absolutely essential to a good photograph.

This was at once admitted by nearly all that I called upon, but excused on the ground of insufficient payment. Something like the following was almost invariably said:—"What can you expect for $2.50 for cards and $5 for cabinets (10s. 3d. and 20s. 6d.), and we can't get more? Besides, it's only the commoner people we get, who don't know a good picture from a bad one, and would rather have the white faces than not, especially the coloured ones. Bless you! *they* would'nt have a bit of shadow in their face, not for any money. The rich folks all go to New York, Philadelphia, or Boston, where they willingly pay twice my prices; and, of course, get better 'fixed'"—this "fixed" being a verb of universal application for anything that has been done, from the cleaning of one's boots to the erection of a palace. By-the-bye, speaking of cleaning boots, I would seriously advise all who may purpose visiting this country to take a few lessons in that useful accomplishment. For some reason that I have altogether failed to discover it would seem to be considered a kind of degradation for any one to clean the boots of another person. A servant girl who will do almost anything else would rather throw up her situation than touch a blacking brush, and the wife of even a labouring man would sit quietly by and see her husband doing it himself, or let him go with boots as brown as the road on which he has to walk. So much is this the case that I have within a few days actually seen two gentlemen—one a landed proprietor owning almost as much as the eye could see of one of the most highly-cultivated and beautiful vallies in the United States; the other the president of one of the most flourishing banks, and both keeping numerous male and female domestics—actually brushing their own boots! Even hotel servants are not exempt from this curious prejudice, and, as a rule, there is nothing gained by leaving one's boots outside the bedroom doors. Of course there are "boot blacks" in the larger cities; but even they would seem to look on the occupation as one for which some compensating advantage was necessary, and, consequently, require a fee of fifteen cents for the performance of the operation. Surely sevenpence halfpenny is a *leetle* too much for a touch of Day and Martin!

But the notions of independence of some of the American women are sometimes even more troublesome than in the matter of boot-cleaning, and extend frequently to a determination to sit only as they please when being photographed. Nor are they exempt from the privileges not infrequently claimed by their sisters on the other side, *i.e.*, of changing their minds as often as, and whenever, they please. An amusing instance of this I saw while in a studio in one of the villages already named. The lady was tolerably pliable while being posed, only stipulating that she should "not be took like them foolish people as had'nt more'n half a face, or had bin a fitin and ashamed to let the other eye be seen;" but just as the usual word of caution had been given, and the cap removed, she suddenly exclaimed—"Stop, Mr. Photographer! I ain't used to bin fixed this way! I guess I can fix myself better," and, crossing one leg over the other, and folding her arms, continued:—"Now get along, and don't you stop a bit too soon, as I shan't have it a bit less than the biggest of them in that glass box!" Of course a second plate was prepared, and then the exposure was made. Before payment was made there was a little difficulty, as she wanted to see "how it was;" but on being assured that "the machine" had gone long enough to make a picture sufficiently large to fill the card she seemed perfectly satisfied.

A visit to the United States would not be complete unless it included Niagara, and so in my next I shall have something to say of the peculiar class of photography practised there and of the men who practise it. JOHN NICOL, Ph.D.

COMPOSITE PORTRAITS,

MADE BY COMBINING THOSE OF MANY DIFFERENT PERSONS INTO A SINGLE RESULTANT FIGURE.

[A communication to the Anthropological Institute.]

I SUBMIT to the Anthropological Institute my first results in carrying out a process that I suggested last August in my Presidential Address to the Anthropological sub-section of the British Association at Plymouth, in the following words:—

"Having obtained drawings or photographs of several persons alike in most respects, but differing in minor details, what sure method is there of extracting the typical characteristics from them? I may mention a plan which had occurred both to Mr. Herbert Spencer and myself, the principle of which is to superimpose optically the various drawings and to accept the aggregate result. Mr. Spencer suggested to me in conversation that the drawings reduced to the same scale might be traced on separate pieces of transparent paper and secured one upon another, and then held between the eye and the light. I have attempted this with some success. My own idea was to throw faint images of the several portraits, in succession, upon the same sensitised photographic plate. I may add that it is perfectly easy to superimpose optically two portraits by means of a stereoscope, and that a person who is used to handle instruments will find a common double eyeglass fitted with stereoscopic lenses to be almost as effectual and far handier than the boxes sold in shops."

Mr. Spencer, as he informed me, had actually devised an instrument, many years ago, for tracing, mechanically, longitudinal, transverse, and horizontal sections of heads on transparent paper, intending to superimpose them, and to obtain an average result by transmitted light.

Since my address was published I have caused trials to be made, and have found as a matter of fact that the photographic process of which I there spoke enables us to obtain with mechanical precision a generalised picture—one that represents no man in particular, but portrays an imaginary figure, possessing the average features of any given group of men. These ideal faces have a surprising air of reality. Nobody who glanced at one of them for the first time would doubt its being the likeness of a living person. Yet, as I have said, it is no such thing; it is the portrait of a type, and not of an individual.

I begin by collecting photographs of the persons with whom I propose to deal. They must be similar in attitude and size, but no exactness is necessary in either of these respects. Then, by a simple contrivance, I make two pinholes in each of them, to enable me to hang them up one in front of the other, like a pack of cards, upon the same pair of pins, in such a way that the eyes of all the portraits shall be as nearly as possible superimposed, in which case the remainder of the features will also be superimposed nearly enough. These pinholes correspond to what are technically known to printers as "register marks." They are easily made; a slip of brass or card has an aperture cut out of its middle, and threads are stretched from opposite sides, making a cross. Two small holes are drilled in the plate, one on either side of the aperture. The slip of brass is laid on the portrait with the aperture over its face. It is turned about until one of the cross threads cuts the pupils of both the eyes, and it is further adjusted until the other thread divides the interval between the pupils in two equal parts. Then it is held firmly, and a prick is made through each of the holes. The portraits being thus arranged, a photographic camera is directed upon them. Suppose there are eight portraits in the pack, and that under existing circumstances it would require an exposure of eighty seconds to give an exact photographic copy of any one of them. The general principle of proceeding is this, subject in practice to some variation of details, depending on the different brightness of the several portraits:—We throw the image of each of the eight portraits in turn upon the same part of the sensitised plate for ten seconds. Thus, portrait No. 1 is in the front of the pack; we take the cap off the object-glass of the camera for ten seconds, and afterwards replace it. We then remove No. 1 from the pins, and No. 2 appears in the front; we take off the cap a second time for ten seconds, and again replace it. Next we remove No. 2, and No. 3 appears in the front, which we treat as its predecessors, and so we go on to the last of the pack. The sensitised plate will now have had its total exposure of eighty seconds; it is then developed, and the print taken from it is the generalised picture of which I speak. It is a composite of eight component portraits. Those of its outlines are sharpest and darkest that are common to the largest numbers of the components; the purely individual peculiarities leave little or no visible trace. The latter being necessarily disposed equally on both sides of the average, the outline of the composite is the average of all the components. It is a band and not a fine line, because the outlines of the components are seldom exactly superimposed. The band will be darkest in its middle whenever the component portraits have the same general type of features, and its breadth or amount of blur will measure the tendency of the components to deviate from the common type. This is so for the very same reason that the shot-marks on a target are more thickly disposed near the bull's-eye than away from it, and in a greater degree as the marksmen are more skilful. All that has been said of the outlines is equally true as regards the shadows, the result being that the composite represents an averaged figure whose lineaments have been softly drawn. The eyes come out with appropriate distinctness, owing to the mechanical conditions under which the components were hung.

A composite portrait represents the picture that would rise before the mind's eye of a man who had the gift of pictorial imagination in an exalted degree. But the imaginative power, even of the highest artists, is far from precise, and is so apt to be biased by special cases that may have struck their fancies that no two artists agree in any of their typical forms. The merit of the photographic composite is its mechanical precision, being subject to no errors beyond those incidental to all photographic productions.

I submit several composites made for me by Mr. H. Reynolds. The first set of portraits are those of criminals convicted of murder, manslaughter, or robbery accompanied with violence. It will be observed that the features of the composites are much better looking than those of the components. The special villainous irregularities in the latter have disappeared, and the common humanity that underlies them has prevailed. They represent, not the criminal, but the man who is liable to fall into crime. All composites are better looking than their components, because the averaged portrait of many persons is free from the irregularities that variously blemish the looks of each of them. I selected these for my first trials because I happened to possess a large collection of photographs of criminals through the kindness of Sir Edmund Du Cane, the Director-General of Prisons, for the purpose of investigating criminal types. They were peculiarly adapted to my present purpose, being all made of about the same size and taken in much the same attitudes. It was while endeavouring to elicit the principal criminal types by methods of optical superimposition of the portraits, such as I had frequently employed with maps and meteorological traces,* that the idea of composite figures first occurred to me.

The other set of composites are made from pairs of components. They are selected to show the extraordinary facility of combining almost any two faces whose proportions are in any way similar.

It will, I am sure, surprise most persons to see how well defined these composites are. When we deal with faces of the same type, the points of similarity far out-number those of dissimilarity, and there is a much greater resemblance between faces generally than we who turn our attention to individual differences are apt to appreciate. A traveller on his first arrival among people of a race very different to his own thinks them closely alike, and a Hindu has much difficulty in distinguishing one Englishman from another.

The fairness with which photographic composites represent their components is shown by six of the specimens. I wished to learn whether the order in which the components were photographed made any material difference in the result, so I had three of the portraits arranged successively in each of their six possible combinations. It will be observed that four at least of the six composites are closely alike. I should say that in each of this set the last of the three components was always allowed a longer exposure than the second, and the second than the first, but it is found better to allow an equal time to all of them.

The stereoscope, as I stated last August in my address at Plymouth, affords a very easy method of optically superimposing two portraits, and I have much pleasure in quoting the following letter, pointing out this fact as well as some other conclusions to which I also had arrived. The letter was kindly forwarded to me by Mr. Darwin. It is dated last November, and was written to him by Mr. A. L. Austin, from New Zealand, thus affording another of the many curious instances of two persons being independently engaged in the same novel inquiry at nearly the same time, and coming to similar results:—

"To Charles Darwin, Esq. "*Invercargill, New Zealand, Nov.* 6, 1877.

"SIR,—Although a perfect stranger to you, and living on the reverse side of the globe, I have taken the liberty of writing to you on a small discovery I have made in binocular vision in the stereoscope. I find by taking two ordinary *carte-de-visite* photos. of two different persons' faces, the portraits being about the same sizes and looking about the same direction, and placing them in a stereoscope, the faces blend into one in a most remarkable manner, producing in the case of some ladies' portraits in every instance a *decided improvement* in beauty. The pictures were not taken in a binocular camera, and therefore do not stand out well, but by moving one or both until the eyes coincide in the stereoscope the pictures blend perfectly. If taken in a binocular camera for the purpose, each person being taken on one-half of the negative, I am sure the results would be still more striking. Perhaps something might be made of this in regard to the expression of emotions in man and the lower animals, &c. I have not time or opportunities to make experiments, but it seems to me something might be made of this by photographing the faces of different animals, different races of mankind, &c. I think a stereoscopic view of one of the ape tribe and some low caste human face would make a very curious mixture; also in the matter of crossing of animals and the resulting offspring. It seems to me something also might result in photos. of husband and wife and children, &c. In any case the results are curious if it leads to nothing else. Should this come to anything you will no doubt acknowledge myself as suggesting the experiment and perhaps send me some of the results. If not likely to come to anything a reply would much oblige me.

"Yours very truly, "A. L. AUSTIN, C.E., F.R.A.S."

Dr. Carpenter informs me that the late Mr. Appold, the mechanician, used to combine two portraits of himself under the stereoscope. The one had been taken with an assumed stern expression, the other with a smile; and this combination produced a curious and effective blending of the two.

* *Conference at the Loan Exhibition of Scientific Instruments*, 1878. Chapman and Hall. Physical Geography Section, p. 312, *On Means of Combining Various Data in Maps and Diagrams*, by Francis Galton, F.R.S.

Convenient as the stereoscope is, owing to its accessibility, for determining whether any two portraits are suitable in size and attitude to form a good composite, it is nevertheless a makeshift and imperfect way of attaining the required result. It cannot of itself combine two images; it can only place them so that the office of attempting to combine them may be undertaken by the brain. Now the two separate impressions received by the brain through the stereoscope do not seem to me to be relatively constant in their vividness, but sometimes the image seen by the left eye prevails over that seen by the right, and *vice versâ*. All the other instruments I am about to describe accomplish that which the stereoscope fails to do; they create true optical combinations. As regards other points in Mr. Austin's letter I cannot think that the use of a binocular camera for taking the two portraits intended to be combined into one by the stereoscope would be of importance. All that is wanted is that the portraits should be nearly of the same size. In every other respect I cordially agree with Mr. Austin.

FRANCIS GALTON, F.R.S.

(To be concluded in our next.)

A WRINKLE FOR THE PRINTER.

WHEN a great quantity of paper has to be prepared in limited room, and when this has to be done so as to have it ready for use as soon as possible, the ordinary process soon proves itself useless, since almost everywhere, with few exceptions, the room for the preparation of paper is awarded, in a very stepmotherly manner, an area seldom exceeding four square metres in floor measurement. If in such a small laboratory an operator has his large silver bath, or perhaps even two—one for salted and the other for albumenised paper—and then has to hang up six or eight sheets to the lines, there remains but little room for anything else; so when a great quantity has to be prepared the first batches must be completely dried by artificial means.

In this case, as when the paper is left to dry spontaneously, the drying does not proceed equally, but the upper part of the sheet is already dry while the under edge is still wet. This is accompanied by many drawbacks which will at once suggest themselves to the worker. A sheet dried in this way will never have the same tone throughout; one half will be warmer and the other half colder. This peculiarity will be of but little consequence if the sheet be cut up for *cartes* and not used for large pictures. Such sheets are also affected unequally by the fixing bath, those parts which remained longest wet requiring to remain longest in the soda. All these things are, however, but trifles, and were not the principal reasons why I looked out for another mode of preparing the paper. My weightiest reason was the want of room for preparing large quantities of paper and the difficulty of getting it ready for immediate exposure. To attain this twofold end I proceed now in the following way:—

All paper, but especially albumenised paper, is stored in an unheated room, so that it may not become dry and brittle, but always remain soft and supple. In the heat of summer, when it might be too hard and brittle, I take it some hours before silvering it, or the night before, and place it in the damp room so that it may attract a little moisture, as nothing is more perverse than paper that will not lie flat upon the bath but always rolls up, except, perhaps, when air-bubbles make their appearance. This dry paper also does not take on the silver so equally as that which contains a certain quantity of moisture; and, in fact, the whole process goes much more smoothly with the latter sort. I now place my sheet upon the bath and let it float, with a gentle movement, for a minute and a-half or two minutes. In order to produce the same result the time of floating should be the same for all the sheets. At the end of that time I draw each sheet slowly out of the bath and place it, wet side lowermost, upon a sheet of chemically-clean blotting-paper, placing above it a sheet of strong, smooth packing paper, and with the palms of my hands I smooth it out in all directions, giving the pressure, which, having the sheet between my hands and it, it can now bear, so that all the moisture may be sucked up by the sheet of blotting-paper below it. Of course the table upon which the three layers of paper are laid ought to be perfectly flat. The paper may be rubbed until it is almost dry, and then be laid aside at once, but that is not necessary, as without it by the time I come to the fourth sheet the first will be ready for use.

Of troublesome blisters there can be no question with this mode of preparation. Blisters are principally caused by unequal drying; when the wet sheets are hung up to dry the moisture collects in little drops, which evaporate very slowly and separate the albumen from the paper, as is seen afterwards in the toning and fixing baths. If very woolly filter paper has been used for drying it is well to rub down each sheet of albumenised paper with wadding or a fine rag before laying it out for use, in order to remove any small fibres that may have stuck to the somewhat adhesive albumenised surface. The filter paper may be used for a long period, only from time to time it should be laid aside as it becomes at length too wet to fulfil its purpose, and should then be dried at the stove either in the dark or in the evening, as the blotting-paper should not contain any reduced silver. From time to time a fresh sheet of blotting-paper is laid on the table, but the old one is always left under it.

At first I feared that this way of preparing the paper would be more expensive than the ordinary way, but I soon came to be of another opinion. One surprising fact is that the silver bath always became stronger—though not, perhaps, according to the argentometer, which is unreliable, and is generally wrong, because albumen and other organic substances which have meanwhile been communicated to the bath interfere with its action—but by the practical test of the gradually increasing depth and brilliancy of the prints. I was induced to investigate the cause of this remarkable phenomenon, and have succeeded in discovering it.

The following experiment should be made with the old preparation process—that is, by that in which the sheets are hung up wet:—Take a silver bath and sensitise on it as much paper as will allow the same quantity of silver containing fluid to drip from it and to be collected in a bottle as shall equal in bulk the quantity of silver solution left in the bath. Evaporate each separately, and it will be found that the solution which has dripped from the paper does not contain half as much silver as the preparation bath does. What is the inference? That the chlorine contained in the paper has combined chemically with the greater part of the silver contained in the solution, and has allowed the water to retain and carry off but a small proportion of silver. The greater the chlorine contents the weaker will the solution run off apparently be, as a proportion greater of chlorine can, of course, reduce more silver. The original bath, on the contrary, into which no weak silver solution drips, and which, being kept in an open dish, must lose no inconsiderable proportion of its water by evaporation, will always become more concentrated. This concentration, indeed, frequently reaches a point when it becomes necessary to add more water. From these observations I have arrived at the conclusion that there is really not much silver absorbed by the blotting-paper, since what it does suck up is merely the solution that would otherwise run off and which contains but little silver; so that really there is none lost if, when the blotting-paper can be used no longer, it be reduced to ashes in order to recover the silver.

Besides the comfort of being able to prepare a great quantity at a time, and to expose it soon after, this way of preparing paper possesses the advantage over the other that, owing to the quick drying, the sensitive film is entirely on the upper surface and cannot sink into the substance of the paper itself. The print is, therefore, more upon the upper surface, and is consequently softer and more brilliant and considerably more easily fixed. A very weak soda bath can then be used, five per cent. of the salt being sufficient, and a very small addition of bicarbonate of soda has a favourable effect on the whites.

In the case of solar enlargements this process renders real service. It often happens that an artist has to wait for weeks for the sun, and thus cannot prepare the paper as he would like; but paper prepared by my method may be kept for fourteen days after it is silvered without being exposed. A longer time is injurious, but then it allows one to count upon working with freshly-prepared paper with greater ease and certainty. At length, after long seclusion behind the clouds, the sun peeps out tantalisingly from beneath his invisible cap. The experienced eye of the photographer sees, however, that this splendour will not last long. Still his customers press him so sorely that he is fain to try to take advantage of the bright moment. Now if he work by the wet method, by which he has to wait for hours while his paper dries, his trouble and outlay will in all probability be lost, and the hypocritical Sun will have long ago made up his mind to enjoy himself behind his curtain of grey clouds. Therefore I praise the dry process. The photographer would run and take out his sheet of chlorine or iodine paper, float it on the silver bath, and at the end of two minutes dry it, arrange the mirror, and expose, the whole operation scarcely occupying ten minutes; that is, supposing the negative to be suitable and that he works by development. We can only complete the printing when we can count on steady sunshine. Enlargements prepared and developed by my own peculiar process possess such extraordinary power and depth that it seems almost superfluous to print them out fully.

I have prepared my paper for a considerable time now by the method described above, and can warmly recommend it to all my colleagues as combining in itself a number of advantages. F. W. Geldmacher.
—Monatsblätter.

ON THINGS IN GENERAL.

Are we really going to have a revolution in photographic practice? For years we have been told that dry plates can be made more sensitive than wet; but the pudding has never stood the proof of eating—at anyrate in public; and I, along with the majority, shrewdly suspect I have put down all these statements to the power of that feeling of love that all parents have for their own offspring, which teaches them to see beauties where, to the impartial mind, all is plain or ugly. But now there seems to be a concurrence of testimony, and the pudding is offered for public consumption.

I see plates by Mr. Swan—than whom there could not be a more trustworthy exponent of any new process—Mr. Mawdsley, and Mr. Kennett are being advertised with statements as to their capabilities that make the photographic mouth water. Four times the accustomed rapidity* seems to be the recognised amount of acceleration obtained upon ordinary work by the aid of the new plates. I sincerely hope that these roseate views may stand the ordeal of test, and that there may be no counterbalancing disadvantage in connection with their use, though this would be against all previous photographic rule, as we nearly always discover a loss of some kind for every gain in one direction. I cannot help it, but, somehow or other, I think we have not yet got hold of the photographic philosopher's stone.

* Our contributor is in error here: such a degree of rapidity has not been claimed by any of these manufacturers.

Still, in the same direction, we hear of new processes from France. My readers may recollect my hinting some little while ago that I smelt another process in the wind, and now it is out at last, "exploited" by a gentleman known to fame already—fine art by machinery. M. Klary, of Algiers, has taken in hand the process of M. Boissonnas, of Geneva, by means of which he tells us that we can reduce our exposures to one-fourth or one-fifth, and which he states that even he himself, case-hardened as he must be by daily contemplation of the magnitude of the results obtained by his own process, "is surprised by the almost instantaneous character of the new process," which, he says, "is calculated to produce a profound sensation." It requires neither special apparatus, peculiar manipulation, nor any chemicals beyond what are ordinarily found in the photographer's dark room. He has arranged to show it to any gentlemen visiting the Paris Exhibition, and is ready to grant agencies of every kind—to individuals, for a town, city, or province. I am bound to say that he has some testimonials from photographers of the highest calibre; but, then, was there ever a process exploited that had not? and these names may be supposed to be biassed, as most of them have bought the right for a district. I presume the advertisements which, so far, are confined to continental and American journals, will soon find their way here. The process is being strongly "pushed" in America by M. Lambert under the name of "The Lightning Process."

Some worthy gentleman has been writing to the *Lancet*, suggesting a grand discovery, that a sitter, when in photographic durance vile, should, during exposure, look not at an actual point but over a certain circumscribed space, that his eyes may not be tired or dazed, and rendered expressionless. He seems to have experimented upon the plan with a photographer of some repute; surely the latter must have been merely affecting to the worthy doctor an artificial surprise and interest in his idea, for I cannot believe, that at the present day, any photographer of skill could ask his sitter to confine his gaze to a point instead of allowing it to wander over a space not too large. But the doctor does deserve credit for his suggestion that a moving object be presented, though, as shown by Dr. Nicol's American jottings, the plan is in operation at the present time in America, Mr. Gutekunst employing clockwork to revolve a series of pictures in front of his sitters.

I do not know when we shall hear the last of the coloured glass theory; at the meetings of the Photographic Section of the American Institute they are still hammering away at it, theoretical and practical fancies of the crudest kind being displayed. One gentleman seems to hrve made a most laborious series of investigations with glasses and solutions of all colours. Among one of the remarkable results he obtained was the discovery that if a cell containing a solution of iodine in bisulphide of carbon were placed before the lens, so as to destroy all visible image, the photographing of the object beyond went on perfectly. "In fact," he says, "I believe instead of cutting off it accelerates, because among those trials there was one that required twelve minutes' exposure." * * * "I used a cell of this bisulphide of carbon, made an exposure of four and a-half minutes, and you see the result." The result is not stated, but it is inferred, and with such a gigantic problem before me I must "give up" for this month.

Free Lance.

ROYAL INSTITUTION LECTURES.

On Colour and Absorptive Media.

Lord Rayleigh, M.A., F.R.S., gave the first of a course of four lectures on colour on Thursday, the 2nd instant. Referring to coloured ribbons before him, his lordship explained that the retina of the eye is acted on by light and not by matter; and that, even when there is light, there may be no distinctions of colour. Thus, with the monochromatic yellow flame of soda, he showed that coloured ribbons became black. To understand colour, therefore, light must be studied. Having produced a magnificent spectrum by prisms applied to the electric light, and thus demonstrated the composite character of light, he explained that all the various colours are due to different degrees of bending from the straight line (refrangibility)—red being the least and violet the most refrangible. No ray of the continuous spectrum thus produced, he said, can be further decomposed by a prism; it is homogeneous, but may be affected by polarisation. Natural bodies possess the power of extinguishing or, as it is termed, absorbing the light that enters them. This power is selective. When the light falling on a body is wholly absorbed it is black; when it is equally absorbed, but not totally, it is grey; and, when unequally absorbed, it is coloured. The ray not absorbed is reflected. When all the rays of the spectrum are absorbed except blue, that is the colour of the body—the colour which it reflects. This was illustrated by a series of experiments with coloured glasses and liquids, made with large prisms and the electric lamp, but which, his lordship explained, may be easily performed with small glass prisms and daylight. Thus a red object in the red rays of the spectrum retained its colour, but became dark in the orange and green rays and black in the blue ray. In like manner other bodies retained their colour in the corresponding rays of the spectrum, but lost it in other rays. His lordship showed that cobalt glass allows blue and red light to pass; a blue liquid cut off all but the blue, a red glass and blue liquid cut off all light, and a solution of litmus permitted the passage of red and blue. The spectrum apparatus thus affords the means of analysing compound colours and ascertaining their components. The colour of "Newton's rings" is not due to absorption, but to the differing thickness of a film or air between a lens and a plane surface of glass; and the colour of ruled lines is due to diffraction, the action of the grating resembling that of a prism.

Lord Rayleigh began his second lecture on Thursday, the 9th inst., by commenting on the opinion of Sir David Brewster, that monochromatic light not only stops certain rays of the solar spectrum but also modifies their colour. This, being incompatible with the wave theory of light, led to close investigation by Airy, Helmholtz, and other philosophers, who demonstrated that any such change of colour must be attributed to imperfection in the prism, and that when the colour of the ray is pure it cannot be further decomposed. Lord Rayleigh then showed by experiment the imperfection of visual testimony. The shadow of an object by green electric light appeared red when illuminated by gas light. He next explained the phenomena of fluorescence, as studied by Professor Stokes, who proved that rays of light of such a high degree of refrangibility as to be beyond the violet end of the visible spectrum become visible when falling upon certain bodies, such as a solution of the disulphate of quinine. It was then shown how a very pure green may be obtained by cutting off two ends of the spectrum—the blue rays by means of a solution of bichromate of potash, and the red by means of a solution of sulphate of copper. The same result was obtained from a mixture of the two solutions. His lordship then explained a novel method by which he measured the varying degrees of absorption of different bodies. Two slits, backed by light of the same intensity, having been placed at the green part of the spectrum (for example), their spectra were so thrown on the screen that the green of the one should overlap the green of the other. When the lights of both slits were of equal intensity their brightness was equal; but when an absorbing medium was interposed between the prism and one of the slits a part of the light was held back, and to restore the brightness the slit had to be widened. Thus, by comparing the width of the two slits, a tolerably accurate measurement of the amount of the absorption is obtained. A curve showing the amount of absorption of chromium chloride was exhibited. The change of colour due to various thicknesses of the absorbing medium, termed "dichromatism," was also shown; by chromium chloride, with a great thickness, blue glass became red. Colours, as seen by the eye, are rays which penetrate the coloured body, and which are either seen directly or are reflected by the interior surface back to the eye. Thus, a solution of bichromate of potash in a black vessel had no colour, as seen from the top, but became a bright red when a white plate was placed beneath the surface. The entering rays were thereby reflected back instead of being absorbed.

His lordship commenced his third lecture on Thursday, the 16th inst., by noticing some exceptions to the rule which ascribes the colours of bodies to absorption. For instance, the colour of gold and other metals is due to reflection. The absorption colour, also, greatly depends upon the degree of thickness of the substance through which the light passes. The colour reflected from a body almost opaque is complementary to its true colour (*i.e.*, as green is to red); but if the light pass too far into the substance before it is reflected no colour appears. Lord Rayleigh showed that crystals of the beautiful coal-tar dye magenta, which to the eye appear yellowish-green, become crimson by transmitted light. His lordship then proceeded to the consideration of compound colours, ingeniously illustrated by coloured paper discs, sectors of which could be combined, the different colours being mixed by rotation of the discs placed upon a whirling-table, and thus rendered visible to the audience. For private experiments the discs may be revolved on a large pin. Many interesting results were thereby produced. The rotation of a disc half black and half white gave light-grey; increasing the black reduced the luminosity, the effect resembling that of diminished light. Various shades of any colour were formed by adding black to it in different proportions, and various tints by adding white in a similar manner. This was specially demonstrated with the colour red. A combination of black, yellow, and white discs produced drab, and browns and drabs were shown to be darkened varieties of yellow, orange, and red. Lord Rayleigh, having ascertained by experiments the exact proportions of each colour required to be placed upon the disc in order to procure certain varieties of shades and tints, recorded the figures, and arranged them in a tabular form. This he exhibited; and he showed that, by reference to it, he was able to predict the results of certain combinations of colour, and produce them at will. Thus: a combination of 67 parts red, 49 green, and 50 blue gave the same grey as a combination of 34 white and 132 black. The result of a mixture of 23 green, 44 yellow, and 99 blue matched that of 118 black and 48 white. Among other combinations, it was shown that red and green will produce a match for black, yellow and white; and that a pink, the result of a mixture of red and yellow, may be matched by combining black, white, and red.—*Illustrated London News.*

PHOTOGRAPHY IN COURT.

THE COPYRIGHT ACT.

On Saturday, 25th inst., Asher Grosse, a Dutch Jew, living at 1, Castle-alley, Whitechapel, appeared at the Worship-street Police Court to two summonses, charging him with having infringed the Copyright Act by selling pirated copies of two pictures, called respectively *The Last Kiss* and *Grace Darling*.—The prosecutor was Mr. Benjamin Brooks, fine art publisher, of 171, Strand, and the copyright of the pictures in question was his property.—Evidence was given showing that the defendant was a hawker of photographs of pictures, &c., and was in the habit of standing with a stall in Whitechapel. On the 6th of May a person named Burgess, a private inquiry agent employed by the prosecutor, found on the stall a photograph of the picture *Grace Darling*. He bought it, and on the 7th inst. another copy, and a copy of the picture called *The Last Kiss*. On that occasion he had a conversation with the defendant, the purchase being effected at the lodging of the defendant, and he admitted that the pictures were copyrights and difficult to get, so that they had to be careful as to whom they sold them. He paid 1s. 3d. each for the pictures. The defendant admitted that he had sold three gross of the pictures that morning.—Mr. Brooks said that the pictures were usually sold at half-a-guinea. There was no idea that defendant was the importer or photographer of the pictures. That person was well known, and during the past week a search warrant had been obtained, and negatives of the pictures had been seized upon the premises of the importer or photographer.—Mr. Bushby said that the onus of proving that the defendant knew the pictures were copyright lay upon the complainant, and he had failed to satisfy the court on the point.—The summons would, therefore, be dismissed.——Solomon Wood, a hawker, of the same address, was summoned for a similar offence. The evidence of the witnessess showed that the defendant was hawking pictures in the street, and among them was the picture of *The Last Kiss*. The witness bought it for a shilling, told the defendant that it was copyright, and that he would get into trouble. The defendant said he could not help it and did not care, and that the picture was copyright. He refused his address, and a constable had to be fetched.—Mr. Bushby fined the defendant £5, including costs.

On Tuesday last, the 28th inst., J. Lees, of 60, Exmouth-street, Clerkenwell, appeared before Mr. Hannay, in answer to a summons charging him with infringing the Copyright Act, 25 and 26 Vict., cap. 68, by selling a pirated copy of a picture called *The Last Kiss*, the copyright of which Mr. Benjamin Brooks, fine art publisher, 171, Strand, alleged was vested in him. Mr. Louis Lewis, solicitor, appeared for the prosecution; Mr. Ricketts for the defence. Evidence having been given as to the purchase of the picture, an argument ensued as to a knowledge that the work was copyright being necessary to conviction; and Mr. Hannay, who said he inclined to the affirmative, adjourned the case.——James Dabbs, of 16, Reform-place, Clerkenwell, was summoned for selling pirated copies of the *Soldier Boy's Dream*, *Grace Darling*, and *Evening Prayer*, copyright in which is vested in Mr. Brooks. It appeared that the defendant had several barrows, and had been previously cautioned. About 200 copies were found on a barrow belonging to him. Evidence as to this fact having been given, Mr. Brooks was called, and in his evidence he stated that the pirated copies were issued wholesale to hawkers living in thieves' dens and back slums. He had dogged them about with a view to obtaining information, and had had his nose broken, his head smashed, and his pocket picked. (Laughter.) He had had to get the police to buy copies for him. One of these men was reported to have said last week, "If I see Brooks I will have his liver." Another man had sold as many as a gross of pirated copies in one morning, and had made over £30 by it. Sometimes men stood opposite his warehouse with a barrow, and said, "Outside you pay a penny; inside you pay a guinea." (Laughter.) When witness asked their name they would reply, "That is my name," and put their fingers to their nose. Mr. Ricketts: Has the defendant done that?—Mr. Brooks: I can't say the defendant is the man.—Mr. Ricketts said it was unfair to visit the sins of all the costermongers in London upon the defendant.—Mr. Brooks: I believe he is the man whom I met one day and asked, "Is this a profitable game?" He said, "Yes; I have made fifteen 'quid' today." I then said, "What were you?" and he replied, "I was a costermonger, but I have now taken to the fine arts." (Laughter.) In re-examination by Mr. Lewis, Mr. Brooks said he had 163 cases, and never lost but one till he went before Mr. Bushby the other day. He had prosecuted at Birmingham, Brighton, Hull, and other towns, and only lost one case in reference to a statuette. Mr. Ricketts urged that the defendant was an illiterate man, and probably ignorant of the law of copyright. There was no evidence of a guilty knowledge. Mr. Hannay held otherwise, and fined defendant ten shillings in each case, and the costs.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 3	West Riding of Yorkshire	Oddfellows' Hall, Bradford.
" 3	Photographers' Benevolent	160a, Aldersgate-street.
" 5	Edinburgh	Hall, 5, St. Andrew-square.
" 5	Bristol and W. of Eng. Amateur	Museum, Queen's-road.
" 6	South London	Rooms of Society of Arts, John-st.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

The annual general meeting of this Society was held on the 5th ult.,—Dr. Vogel occupying the chair.

The first business transacted was the admission of three new members, followed by the reading of a communication, from Herr Adolph Ott, *On the Action of Light Upon Chromated Gelatine.*

The Chairman then spoke of the action of iodide of potassium upon exposed plates. He said that, if an iodide of potassium solution of one to ten were poured over an ordinary photographic plate after it had been exposed and washed, the invisible picture would be completely destroyed, so that on developing the plate with iron and silver not a trace of the image would be obtained. But if the silver bath in which the plate was prepared was old and loaded with particles of organic matter the still invisible picture would not be destroyed.

Herr Meyer, of Esslingen, sent a formula which he had bought from Herr Pfeiffer, of Guben, for ten marks. He had not been able to use it, but as he believed it to be a good thing he had sent it to the meeting in case any member would like to try it.

Herr Tiator, of Colmar, sent a specimen of a printer's register which he had arranged, and which furnishes the printer with a convenient form in which to make his returns of the quantity of paper used and prints made, &c.

From Herr Richard, of Zurich, came a communication upon the vexed subject of blisters in albumenised paper, which ran as follows :—

"As the gold used in the bath should bear a certain proportion to the thickness of the albumenised film the fixing bath should also be of exactly proportionate concentration.

"The sorts of albumenised paper in the market are usually divided into ten and eight kilo. albumenised paper of greater and less brilliancy; these are registered as such according to their qualitative and quantitative contents, and thus it is easy to understand that the ten kilo. paper blisters more readily than the eight.

"The blisters, which are more apt to occur with ten kilo. paper, often increase in numbers from day to day, and leave behind them pale rings or spots which render the prints entirely useless. The appearance and increase of these blisters are alike caused by the reaction of the positive bath (which should at once be neutralised on blisters showing themselves), together with too little gold being used in the toning bath.

"The ten kilo. paper always requires a stronger gold bath (at least thirty per cent. stronger) than the eight kilo. paper; and it is not strong enough if the prints (on ten kilo. paper) require to remain more than from five to eight minutes in the gold bath.

"When the duration of the toning can be reduced the blisters will also be reduced; but slow toning is favourable to blistering. My long experience has made me an enemy to all 'perforce means' of avoiding blisters, as most of them are based on a weakening of the picture, which not seldom ruins it. In photography we have as a basis certain fundamental proportions the balance of which is disturbed or even destroyed by the admixture of all sorts of injurious substances; but if we adhere strictly to these fundamental proportions we shall seldom be plagued by blisters and similar flaws. The proportions I have adopted are—

"1.—*Gold Bath to Tone* 500 *Prints on Ten Kilo. Paper* :—

Distilled water	2·5	litres.
Chloride of gold and sodium	1	gramme.
Bicarbonate of soda	1	"

Duration of toning for each print, five to eight minutes.

"2.—*Gold Bath to Tone* 600 *Prints on Eight Kilo. Paper* :—

Distilled water	3·5	litres.
Chloride of gold and sodium	1	gramme.
Bicarbonate of soda	1	"

Duration of toning for each print, ten to twelve minutes.

"1a.—*Soda Bath for* 500 *Prints on Ten Kilo. Paper* :—

Hyposulphite of soda	1	kilo.
Water	5	litres.

Time in bath, fifteen minutes.

"2a.—*Soda Bath for* 600 *Prints on Eight Kilo. Paper* :—

Hyposulphite of soda	1	kilo.
Water	7·5	litres.

Time in bath, twelve minutes.

"The positive bath should not be allowed to become too acid, or the number and size of the blisters will increase. If the baths be prepared exactly according to the proper proportions, no *eau de javelle* or other such preparations will be required.

"Should blisters still be formed on ten kilo. paper they may be made to fall again, without leaving pale rings or spots, by drying slowly at a temperature of 12° to 14° R. In this case, however, they are caused by the positive bath, which must at once be reduced by the addition of distilled water, and restored to the proper percentage.

"By always keeping exactly to these formulæ I am but very, very seldom troubled with blisters, and when that does happen I know that they have their origin in the silver bath, and that by neutralising it they may be made to cease.

"I may say that while using the most strongly-albumenised paper I do not for years back remember having blisters on the paper which left spots. I cannot too strongly recommend the active neutralisation of all the baths."

Nearly all the members present agreed with Herr Richard that blisters occur more readily with strong paper than with thin paper; but

Herr Martini said he had often heard complaints of quite the opposite character.

Herr Richter did not think the gold bath had much to do with it, as untoned pictures were often blistered. He thought that too strong a silver bath was more likely to cause blisters than too weak a one.

Herr Bergemann advised those photographers who found they had on hand a quantity of paper which blistered readily to try some of the preventives which had been mentioned at previous meetings as being successful before returning it to the dealer.

Herr Boll used a weak fixing bath and never had blisters.

Herr Marowsky remarked that Herr Boll added a great deal of chloride of sodium to his toning bath.

Herr Haberland had found a warm fixing bath prevented blisters.

The foregoing remark ended the discussion.

A number of objects were then placed upon the table; after which the Treasurer and the Secretary read their tenth annual report. The office-bearers were then re-elected for the ensuing year, and the President thanked, in the name of the Society, those members who had taken the management of the *conversazione* which had taken place the week before. The meeting was shortly afterwards adjourned.

Correspondence.

OXYGEN RETORTS.

To the Editors.

Gentlemen,—I am sorry to have to ask for space in your next number to inform your readers that the oxygen retort, shown as Mr. W. J. Chadwick's in your issue of the 17th inst., is really a very clumsy copy of my patent retort which I showed to a number of members and friends at the meeting of the Manchester Photographic Society, held February 14th, 1878, and which is noticed at page 103 of The British Journal of Photography for 1878. As there was not time to show it in the large room, I then promised to show it again at a future meeting, but ill health has prevented me doing so.

I enclose a sketch, from which you will see that the retort is kept gas-tight without the risk of burning the fingers, any desired pressure being given to the mouth of the retort by the adjustment of an iron weight upon the rod which supports it. There is also a stand for the retort, by the use of which it may be used on the table, floor, &c., being made of baywood. It weighs one drachm forty-two grains, and is, I think, a very portable retort stand, being quite as efficient as if it weighed twenty pounds. I enclose one of the retort stands in this letter.

I ought to say I can use this retort without either springs, screws, or weight, yet regulating the pressure from ounces to pounds on the square inch, and keep the retort perfectly gas-tight. I think this cap could be applied to the ordinary steam safety valve.

I am pleased that my patent oxygen apparatus is worth copying even by Mr. W. J. Chadwick; at the same time, I feel it my duty to caution your readers and the trade against being drawn into profitless trouble by using or dealing in any infringements of my patent oxygen apparatus.—I am, yours, &c., David Young.

Swinton, May 20, 1878.

[Pressure on our space prevented us from publishing this in our last.—Eds.]

THE "IMPOSSIBILITY" OF FADING.

To the Editors.

Gentlemen,—I can bear testimony also that our "Peripatetic" friend quoted correctly the advertisement which has appeared for a long time in a Chester paper, and, without any doubt, we Cestrians ought to feel proud that the carbon process will ultimately give way to "F.C.S.'s" new permanent process, the particulars of which we who are "not in the know" are waiting patiently for divulgence. What a rush to the offices of The British Journal of Photography there will be that day when it is whispered that the "newest" process is "going to come out!"

But how exquisitely refreshing it is to notice the self-complacency with which "F.C.S." fancies he has put the "Peripatetic" into the pillory. What a consolation it is that "F.C.S." is not the only wise "fellow" in the photographic profession; others there are that can reason—with this difference, however, that they can reason logically. It requires no logic, however, to prove whether "possibility" or "impossibility" is right, for a moment's perusal of Webster's dictionary will dispel all "possibility" of doubt.

"F.C.S." wants the "Peripatetic" to haul down his flag. The latter cannot possibly oblige him, for it is *nailed* to the mast. And the lessons —well! I do not know what lessons "F.C.S." wants him to learn; but that cigar suggestion of the "fellow" is not bad, for if there be one luxury I like more than another it is a good—especially a good peripatetic—cigar. Do please request the "Peripatetic" to keep me a few, though I doubt the "impossibility"—I beg pardon! the "possibility" I mean—of his doing so. As for the Glenlivet "F.C.S." wants the "Peripatetic" to get him: if he has got it, cork it well up, for it will keep for future "*preference.*" But I will do the "handsome," and endeavour to sustain the hospitable reputation of the ancient city if the "Peripatetic Photographer" will let me know his "preference," and meet me at the "Grosvenor" any evening after professional hours.—I am, yours, &c., ATTICUS.

Chester, *May* 27, 1878.

P.S.—At the proposed meeting the question of best and second best *permanent* productions will certainly crop up, and the happy termination of that debate depends most certainly upon the "preferences" imbibed; and the "impossibility"—no! I mean the "possibility"—is, that the last song will be, "He fadeth away!"—A.

[Enough has now been said about this matter. We are much pleased to find that photographers in the provinces exhibit a degree of spirit scarcely known in London in connection with the desire of issuing permanent prints, a desire the gratification of which is now easy.—EDS.]

EXCHANGE COLUMN.

Wanted to exchange, Solomon's enlarging apparatus, magnesium lamp with double burner, in excellent condition, for a good camera 12 × 10 or larger.—Address, R. WINGFIELD, 33, Sidbury, Worcester.

ANSWERS TO CORRESPONDENTS.

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

NOTICE.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

M. DANKS.—We are not yet in a position to report upon the plates.

LL.B.—When you have mastered the instructions given with so much detail in our last ALMANAC write again.

TECHNOLOGIST.—The cautious addition of a very weak alcoholic solution of nitrate of silver will enable you to effect the necessary balancing of the ingredients.

P. C. STORTZ.—The expression must be held merely to mean that the picture was painted by artists in the employment, for the time being, of the photographer named.

GEO. S. BLACK puts to us a straightforward question, although in a tone that savours of pugilism. He demands—"What have you got to say about the fact of spirit photography?" To which our reply is—"Nothing."

R. B. (Leeds).—The best method to obtain such a degree of density as you require is to flood the negative, after fixing, with a solution of bromide of copper. Wash well after this, and apply a solution of nitrate of silver.

ALPHA.—Although the sensitive paper has become slightly discoloured, it will be quite white again after being toned and fixed. Tear off a bit and place it in a solution of hyposulphite of soda, and you will find this to be the case.

W. E. B.—The paper *appears* to be of good quality, but we cannot undertake to try samples of paper sent to us for this purpose. Both makers are highly respectable and reputable, and the probability is that you have failed to fulfil all the requirements.

THOMAS SHAW.—To tone a collodion transparency, immerse it for a few minutes in a weak solution of chloride of gold. To remove such a transparency from the glass attach a sheet of transfer paper, and when it dries it may be peeled off the glass, carrying with it the film.

J. REES.—The manipulation of the pictures has been good enough and the sharpness all that can be desired, but the lighting has been very badly managed. With a light direct in the face of the sitter and in the line of the camera nothing else could be expected than a flat portrait. By means of blinds arrange so that the light shall fall more from one side, then give a full exposure, and avoid too much intensifying.

"PHŒNIX" takes exception to a remark we made respecting the fewness of the number of those who now practice the morphine process. He says that *he* does so. He somewhat strengthens our position by qualifying this statement with an observation that he has not used his camera for nearly two years, from which it appears that "Phœnix," like many others, at one time made use of the morphine process, but has laid it aside.

H. C. JENNINGS.—Such an addition to the lens you mention would be useless, as the lens must be corrected in a special manner, *i.e.*, have a round field and give freedom from astigmation, in order to display the advantage possessed by the concave interceptor. The lens you name is already corrected for flatness of field at the expense of marginal definition of the first order. If this explanation is not sufficiently lucid, please write again.

P. J. K.—Yours is a genuine case of "Rip van Winkle"-ism. We scarcely know what advice to offer. The details of all the processes named can only be obtained by reading the back numbers of our almanacs or journals; for your requirements the former will be the easier. You should also apply to some good-natured, well-informed photographic friend, who will in a few words "post you up" in all that has been accomplished during the past ten years.

R. R. BROWN, Jun.—1. Let the negative be fully exposed, contain full detail, and be rather too thin for producing a first-class print.—2. Either carbon, collodion, or albumen.—3. Retouch on the enlarged negative.—4. No *book* specially devoted to enlarging has been published, but numerous articles, and series of articles, have been published in, or in connection with, this Journal.—5. It is desirable, although not necessary, to back a transparency with opal or ground glass.

GEO. WHITE.—To prevent the film from becoming dissolved when the varnish is applied, make use of a varnish having a very weak spirit as the solvent of the resins of which it is composed. It is also a good plan to flood the surface of the negative with diluted albumen or weak gum water, and allow this to become dry previous to applying the varnish, which will not then exercise any solvent power upon the film, no matter how strong may be the spirit with which the varnish is prepared.

J. J. M.—We are quite conversant with the conditions under which wet collodion transparencies having a warm tone may be produced; but to give all the information you require would compel us to devote the whole of this page to such purpose. The "Answers" column is always reserved for brief practical hints to such as require them, and a lengthy disquisition on a process would be quite out of place in it. We are the less concerned about not acceding to your wish as the information has been given many times, and is to be found in every good manual of the art.

AMATEUR.—We cannot undertake to answer your queries by post, and from the fact of your not enclosing a stamped directed envelope for the replies you crave it is evident that you did not expect us to do so —1. Use a head-rest.—2. Fifteen grains to the ounce.—3. The patent expired five years ago.—4. Certainly not.—5. Yes; we are so fortunate as to know in what manner retouching varnish is made, and so are our readers—that is to say, those who profit by their reading more than you appear to have done, if your own statement as to being such a careful reader be correct.

W. WAINWRIGHT, Jun.—Our correspondent, who exhibited a negative on gelatino-bromide at the last meeting of the Photographic Society of Great Britain—a fact to which reference was made in our report of the meeting—requests us to state that it was made from gelatino-bromide prepared for him by Mr. Mawdsley from the formulæ published by Mr. C. Bennett. He does this in order to prevent a misapprehension which appears to have arisen in consequence of his name being similar to that of a member of a firm professionally engaged in supplying or preparing photographic requisites. We may say that our esteemed correspondent, Mr. W. Wainwright, Jun., is the indefatigable Secretary of the Amateur Field Club, and is not connected professionally, in any capacity, with photography.

G. S. H.—1. There is no doubt that, by intercepting the rays by a plane reflector placed at an angle of 45° to the axis, a far more convenient and in every respect superior instrument will be formed.—2. The two forms of telescope differ, at least, in this respect—that a shorter tube is required, in order to obtain a given power, in the Cassegrainian than in the Gregorian telescope. We cannot speak of the former from possessing any practical acquaintance with it; but we have had a great deal of experience with the Gregorian, and are not very profoundly taken with it. It would appear to be a comparatively easy matter to convert one kind of telescope into the other, the only points of difference between the two consisting in the small central mirror of the Cassegrainian being convex, whereas in the Gregorian it is concave. The latter telescope gives an erect image; in the former the image is inverted.

RECEIVED.—J. Cooper; John White; S. B. Hercus; Robert Banks; "An Opal Enlarger;" and others.

OLD LONDON.—The *Athenæum* announces that the Society for Photographing Relics of Old London proposes to publish the following subjects with its fourth year's issue:—Temple Bar; Gate and Courtyard of 102, Leadenhall-street, demolished in 1875; Houses in Gray's Inn-lane, demolished in 1878; Shop in Brewer-street, Soho; The "Sir Paul Pindar," Bishopsgate-street; Houses in Holborn. Mr. Alfred Marks, of Long Ditton, Secretary of the Society, will receive subscriptions.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 944. Vol. XXV.—JUNE 7, 1878.

PREPARATIONS FOR FIELD WORK.

The following remarks are addressed more particularly to those of our readers who are willing to include themselves under the somewhat broad designation of "tyros" in photography. To the many whose experience has carried them beyond that stage the hints we are about to give will be wholly unnecessary; and there exists also, no doubt, a numerous class who, though considering themselves far above the need of such elementary instruction, might possibly find themselves benefited by it would they but take it to heart. Not for these do we write, but for such of our readers, beginners or otherwise, whose experience in field work and the preparations therefor is of so limited a nature as to render the advice acceptable; and we are sanguine enough to hope that our remarks may have the effect of averting much trouble and disappointment if carefully perused by those for whom they are penned.

Thanks to the numerous photographic societies and to the different publications devoted to photography there is, nowadays, no lack of information with regard to the best processes for employment in the field or other matters connected with the chemistry of our art, but comparatively little is written upon the minor details of a more or less mechanical nature which go so far in the production of successful results. Such matters, though frequently discussed at the various photographic meetings, are seldom considered of sufficient importance to gain a place in the published reports, and hence the beginner, unless fortunate enough to belong to one of the societies or to possess a friend experienced in the unwritten mysteries of the art, is doomed to work his way to success through long lanes of failure and disappointment.

We know many cases of amateurs whose experience, extending perhaps over many months or perhaps years, has enabled them to master thoroughly the various manipulations connected with dry-plate work, and who have, nevertheless, been completely "floored" by the preparations which a tour of some duration involves. It is an easy matter to prepare a few plates for a single day's use and to produce from them, when developed the same evening, an equal number of successful negatives; but when some dozens of plates have to be prepared (probably in a limited time), and have subsequently to undergo the vicissitudes inseparable from travelling, it is needless to say the difficulties are increased. If we add to this the uncertainty which arises from the exposure of a large number of plates without any sufficient data as to the time of exposure, or, if the plates be developed *en route*, the inconvenience which attends the operations when conducted on a strange plate, why wonder if the inexperienced sometimes come to grief? Still it is not difficult to ensure at least a fair chance of success, all that is necessary being a little method in the ordering of the arrangements, including the strictest, in every portion of the chemical manipulations.

The choice of process will, of course, depend upon what the operator has been previously accustomed to; for we scarcely expect a man to make his first essay in a new process when about to commence a holiday tour. But it must be borne in mind that many circumstances which are of little moment when the plates are developed shortly after exposure are wholly unsuited to the requirements of the tourist, who may possibly be compelled to leave his pictures undeveloped for days, or even weeks. Thus films prepared with certain organifiers are found to yield excellent results if prepared within a few hours of exposure, but, if left for a day or two, give inferior results, either from fading of the image or from actual decomposition of the film. A similar result will occur from careless manipulation, or if the plates be insufficiently washed to remove all traces of free silver or of bromide; lengthened keeping before or after exposure will develope defects which would not, perhaps, under other circumstances be produced. For plates requiring to be kept any length of time organifiers of a hygroscopic character should be especially avoided, because, in addition to relapsing the film in a state peculiarly susceptible to atmospheric influences, they render it more liable to injury from dust and other causes. We have recently published several reliable processes from which there will be no difficulty in selecting a suitable one—either bath or emulsion.

We will now turn to the dark room, where the novice will experience many difficulties of a mechanical or routine nature, when working on a large scale, which have probably never obtruded themselves on his notice under ordinary circumstances. The first piece of advice we have to give is to keep the different operations entirely distinct from one another. We have known many cases—especially when the bath is employed and the preparation of the plates is necessarily slow—where the whole of the operations, from cleaning the glass to drying the prepared plate, were carried on considerably; while one plate was sensitising the next was being polished and got ready for collodionising. We cannot too strongly condemn the practice of cleaning or polishing the glass in the dark room—at anyrate when other operations are being conducted; it raises dust and disseminates minute filaments of cotton or silk from the polishing cloth, besides which the glass, if used at once, has not time to part with its electricity, and is in a state highly favourable to attract and retain the matter thus set floating in the atmosphere.

The cleaning and polishing of the glass should be performed, if possible, in another apartment; but at anyrate it should be made an entirely separate operation. It will then be more effectively done; for, the hands not being contaminated with chemicals or moist from contact with the solutions, will be less liable to stain or smear the surface. After polishing the plates the edges are next tipped with india-rubber and reared up in a rack to await the next operation. The dusting should not be done until immediately before coating with collodion. The practice of using a substratum (generally of albumen), once so much in vogue, is now rapidly falling into disuse, as the strong alkaline development generally adopted at the present day acts so powerfully upon the albumen as to render it useless if not absolutely injurious. An edging of india-rubber performs all that is necessary in retaining the film upon the glass.

How far it is possible to keep the remaining operations distinct from one another will depend upon various conditions. If a washed emulsion be used it is advisable to place the plates in the drying-box as soon as possible after coating (that is to say, when thoroughly set), rather than to coat a number and allow them to remain exposed to the atmosphere in the moist state for some time, as they are then more liable to attract dust. If, however, the bath or collodio-bromide processes are used, we advise that the number of plates it is intended to be prepared be advanced only as far as the washing water before commencing to apply the organifier. It is especially dangerous, when using the bath and an organifier containing tannin or gallic acid, to perform the two operations concurrently; the fingers come in contact alternately with the bath solution and the organifier, and the almost inevitable result is seen in stains on the edges of the plates.

Particular care should be observed in every operation to avoid, as far as possible, the great enemy of the photographer—dust or spots. This is doubly the case when using an emulsion, as, from the fact of the latter being thicker and more viscid than collodion, a minute speck of dust upon the plate or in the emulsion itself becomes much more injurious. The emulsion should be carefully filtered from the stock-bottle into a perfectly clean and dry wide-mouthed pouring bottle. It should not be corked, but be fitted with a loose cap, formed by pressing a piece of brown paper over the mouth and neck; this keeps out dust when the bottle is not in use, prevents evaporation, and at the same time there is little chance of small particles of hard emulsion becoming detached from the lip to cause lumps in the film. When the emulsion gets thick after coating a number of plates it is poured back into the filter, the bottle is rinsed out with a small quantity of a mixture of ether and alcohol, which also goes into the filter, and a fresh portion of emulsion added from the stock.

The greatest importance attaches to the careful dusting of the glass immediately before coating. If this be not attended to it is liable to cause spots—not only on the individual plate under treatment, but by introducing specks into the pouring bottle with the portion of emulsion drained back upon each succeeding plate. Should the emulsion commence to show the least tendency to spottiness the best plan is at once to refilter it.

Much trouble is frequently experienced—especially in the absence of a laboratory specially fitted for the purpose—in draining and drying large numbers of plates without attracting dust. An arrangement simple enough as a makeshift, and thoroughly efficient, is as follows:—Procure an old box or packing-case of suitable size, and if necessary fit one or two shelves inside it; paste over the whole of the interior with brown paper or even newspaper in order to form a smooth surface not liable to harbour dust. Some strips of blotting-paper for the plates to drain on complete the apparatus, which is also useful in another direction.

The discomforts attending the preparation of a large batch of plates are in no way lessened by the necessity which exists for working in an extremely non-actinic light; but the degree of illumination may be considerably increased without danger of fogging the plates if the latter be kept as much as possible out of the direct light. As is well known, a sample of orange glass which would fog a bromide plate if allowed to act upon it for several minutes will produce no effect if the exposure be only a few seconds; so that it becomes possible, by suitable arrangements, to use stronger illumination during the preparation of the plates than would be allowable for development. A piece of stiff brown paper laid over the dishes in which the plates are soaking will effect this, and if the draining-box we have described be placed with its back to the light the same effect will be obtained. Should any difficulty be experienced in getting the plates into their places without injury, a piece of white paper or card used as a reflector will supply sufficient light when required for the purpose.

A similar box, with the addition of an opaque curtain over the front, may be used as a drying-box. With the exception of washed emulsion the better plan, in the absence of a proper drying stove, is to allow the plates to dry spontaneously, which they will do in a few hours without any fear of drying marks.

THE CARBON SENSITISING BATH.

At the present time it would be rather an act of temerity to tell such a thrice-told tale as to describe in detail the peculiarities of the silver bath for floating albumenised paper upon, the experience of thousands having all been laid under contribution from time to time till it would be difficult to say anything whatever new upon the subject. Not so, however, with carbon, which is quite a thing of today in comparison with its older sister, silver printing. It is right, however, to say that even in silver printing it was a long while before its possibilities were all known; indeed, it had been in constant use for many years before the fact of its being possible to obtain good pictures with a weak bath was at all commonly known.

We may, therefore, confidently feel that with the carbon process many hints will have to be given from time to time before we can consider ourselves *au fait* with all the details of manipulation peculiar to carbon work in general. One interesting point in carbon printing which at first was entirely neglected, but which afterwards had more attention given to it, is the age of the bichromate bath. This, even when worked down to the last drop, sensitises the paper evenly and sufficiently—a quality quite different from the silver bath, one important reason for which being the fact that the action of the sensitiser is quite different in the two cases. This is a point it would be well always to bear in mind. Thus, each sheet of albumenised paper immersed or floated withdraws a portion of the bulk of the solution with it, but not until the whole solution has been weakened by the precipitation and abstraction of a certain amount of silver by the chlorides in the paper. In the immersion of the tissue, however—which has no salt in its texture—no precipitation occurs, so that each piece merely withdraws a certain amount of solution, that remaining behind being of its original strength. It, therefore, follows that the strength of the bichromate solution would be unimpaired and uniform down to the last drop, except in so far as evaporation by exposure to air would tend to strengthen it.

But, though the strength remains uniform, the solution is not altogether unaltered, for the tissue gives up a portion of its more soluble components, which accumulate in the bath till its character is considerably altered, as shown both by its appearance and its working qualities. The colour indicates a chemical change; but this, though possibly affecting the working quality, would do so in virtue of its own characteristics and not by changing the strength of the solution, the amount thus altered being quite insignificant in proportion to the whole quantity of bichromate present.

We have recently made a number of experiments to ascertain the direction of the change of quality produced by the constant use of the bichromate bath, and we seem to have arrived at a consistent conclusion. The difficulty of doing this is much enhanced by the fact that the tissue itself is so altered in property according to the time allowed to elapse between sensitising and printing, and that the state of the atmosphere so largely affects the printing qualities; thus disturbing elements have to be eliminated mentally before forming a judgment.

We have found, first, that, contrary to our expectations, the dark-looking bath has no perceptible effect in staining the whites of the picture, the colour, such as it is, being washed away in one part or another of the process of development. But though the whites do not suffer through the use of an old and dark-coloured bath, the character generally of the pictures is markedly changed, and not for the better. The developed picture is soft and delicate, but at the expense of vigour and brilliance.

An important characteristic of the carbon process is that it gives, when fairly treated, the most delicate tones and *nuances* of shade, the tending to excess of softness too often resulting in a flat picture. This, again, may be considerably modified by the process of "boiling," as carbon printers term the treatment by water of extra heat. It is again, of course, very easy, on the other hand, to fall into the opposite extreme of hardness, through washing away of the half-tone during development, when even water, as cold as is possible to be made use of, is employed. This, again, is not difficult to remedy, being generally caused—as we were the first to point out—by using tissue too freshly prepared. Thirdly, the tissue sensitised on a much-used bath is usually much more sensitive than that prepared with a new bath—a quality which may be an advantage at times, but which generally is the reverse.

This latter property leads to a consideration of the cause. Sensitiveness and softness usually go together in carbon printing, so that the latter of the two properties we have been naming is the corollary to the former, and may be different modes of stating the same fact. This state of tissue being that which usually would be produced by long keeping, leads to the suspicion that possibly both one and the other may be set down to the hygrometric state of the tissue; that is, as tissue prepared on a new bath gradually absorbs moisture when kept, its state may be assimilated to that prepared on an old bath and used at once.

If this were found to be the case, it would open a very interesting field for experiment. Tissue might be prepared containing little, if anything, besides the gelatine and pigment, and all the other materials now put into the tissue itself might be dissolved in various relative proportions and various strengths in the bichromate bath, which would thus almost be absolutely invariably uniform—a consideration of paramount importance and usefulness.

RECENT PATENTS.

No. VIII.—NESBITT'S PHOTOGRAPHIC TINTING APPARATUS.

This tinting apparatus has already been referred to in this Journal, but no account of it has yet appeared. The following is all the particulars given in the patent specification :—

My invention relates to an improved construction of apparatus for tinting photographs, whereby a single frame is adapted for tinting any size or shape of picture instead of, as hitherto, a separate tinting apparatus being required for each size or shape of picture.

I propose to make my improved apparatus for tinting or giving a border to a photograph of a frame with a back of the exact size of photograph to be tinted, this back being hinged on so as to open and shut to receive the picture, and when it is in to shut and press down tightly on the printing plate. It will also have a rabbet to receive the tinting or name plate (whichever may be required), and a groove in front of this for the introduction of a glass with any size or shape of mask to cover the parts of portrait to be tinted. Thus, in lieu of a separate frame for each size or shape of picture, it will only be necessary to have a separate glass with different size or shape of mask.

I propose to make my improved tinting apparatus of wood, cardboard, or of any other suitable material or combination of materials.

What we have given above is the *provisional* specification, for Mr. G. Nesbitt (of Bournemouth) did not proceed farther than the probationary period implied in this term.

No. IX.—PHOTOGRAPHIC BURNISHERS.

This invention, which like the former only received provisional protection, stands in the names of Messrs. James Wilkinson, James Hardman, and Richard Birtwhistle, of Accrington, and is entitled "Improvements in the Mode or Method of Burnishing Photographs and in the Machinery or Apparatus used therefor."

This invention has for its object the burnishing of photographs, pictures, or portraits so as to give them a more lifelike aspect than hitherto, and consists in passing them, when mounted on cardboard or paper, through a pair of metal rollers heated by gas or steam, whereby the picture or portrait is made to stand out boldly as it were in relief, and give a very natural and lifelike appearance.

To carry out this object the rollers are mounted in suitable bearings having means of adjustment for different thicknesses of paper or cardboard, and provided with a handle at one side to give them motion. At the opposite side to the handle an ordinary gas pipe perforated with a number of holes is passed into each roller, and the gas being turned on and lit, and the photograph put between the rollers, the handle which is fastened to the bottom roller gives motion to it, and by means of wheel gearing to the upper roller, so that the photograph passed between the picture side comes out, as before explained, and the back part of the card with a highly-glazed surface.

When the back of the card is not required to be glazed or burnished, but only the face of the photograph, one heated roller will suffice; but in that case care has to be taken that the picture is put in right side upwards, for which reason we prefer to heat both rollers, as less attention is required in feeding the machine.

No. X.—STANDS FOR PHOTOGRAPHIC ALBUMS.

This invention, or "discovery," is said to be partly made by Herr Hermann Lehmann, of Offenbach-on-the-Maine, Germany, and partly by Mr. George Arthur Hasler, of London, who appears before us as the patentee, and who, for the purpose of this invention, constructs a stand, support, or holder in two portions—an upper one and a lower one. The upper one holds the album in an oblique direction or position in order that its contents may be easily viewed, and it drops or fits on to a spindle or pivot secured to the lower portion. It is free to revolve thereon (with the album attached thereto) in a direction parallel with the plane of the table or surface on which it is placed.

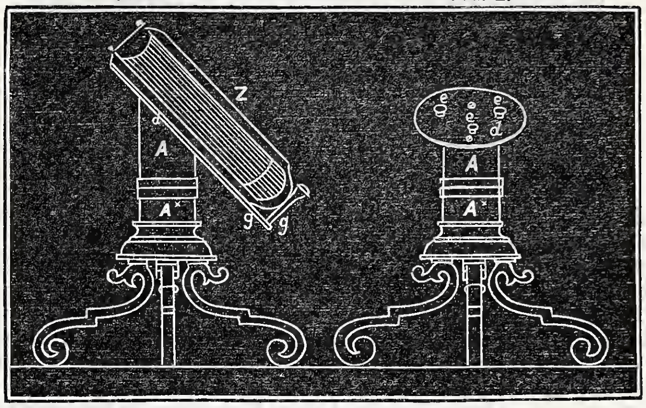
For fixing or attaching the album to the stand, support, or holder, a plate carrying studs, hooks, or other similar contrivances is secured to the upper or revolving portion of such stand, support, or holder, and the studs or hooks engage in slots provided in a corresponding plate to receive them, and which is contrived in the under side or under cover of the album. The album may, however, be readily detached when it is desired to place it on a table.

To prevent undue strain or injury to the back of the album when opened, angle pieces forming stays or brackets are secured to the under side or under cover, and they extend under the back of the album so as to keep it supported.

Such a stand, support, or standard constructed according to the invention is described as follows, aided by the diagrams :—

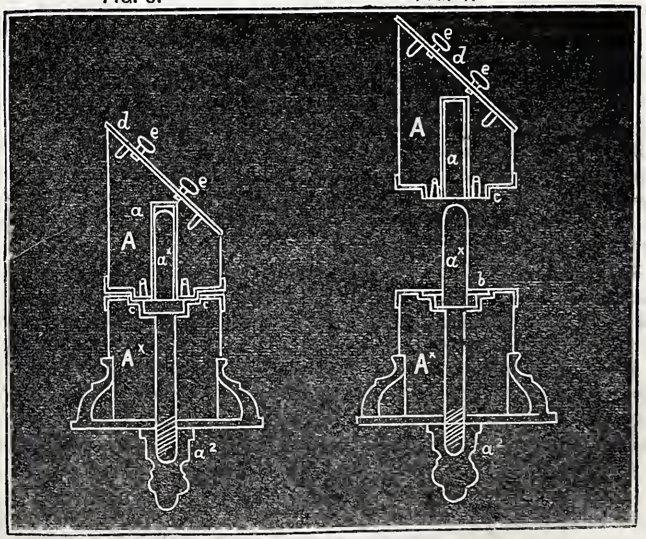
Fig. 1 is a side elevation of a stand with its album attached thereto. *Fig.* 2 is a front elevation of the stand, the album detached therefrom. *Fig.* 3 is a vertical section showing the revolving and stationary portions fitted together or combined; and *fig.* 4 is also a section, but showing these portions separated or detached.

FIG. 1. FIG. 2.



A is the upper and revolving portion, and A× is the lower and stationary portion. The upper and revolving portion A is the one which carries the album Z, and it has a longitudinal orifice a formed in it, into which the pivot or spindle $a\times$ fixed to the lower and stationary portion enters. This upper portion A (with the album) is free to revolve on the pivot or spindle $a\times$ in a direction parallel with the plane of the table or other surface on which the stand is placed.

FIG. 3. FIG. 4.



The pivot or spindle $a\times$ passes through the stationary portion A×, and is secured thereto by means of a nut a^2, tapped to correspond with the lower extremity of the spindle, which is screw-threaded for such purpose. *b* is a circular groove or recess formed in the lower and stationary portion A×, and into which a projection *c* on the upper and revolving portion fits when the said portions are combined. This projection and recess act as a second pit and orifice, and give greater strength and support to the portion holding the album.

In order that the album, when attached to its stand, may be readily inspected, I prefer to hang or attach it thereto in an oblique direction, and for this purpose a plate *d* carrying hooks or studs *e*, or other equivalent contrivances, is securely fixed to the upper and revolving portion A, and these studs fit into corresponding slots *f* in another plate *d*× contrived in the under side or under cover of the album, and hold the album and revolving portion securely together, at the same time permitting them to be revolved.

FIG. 5.

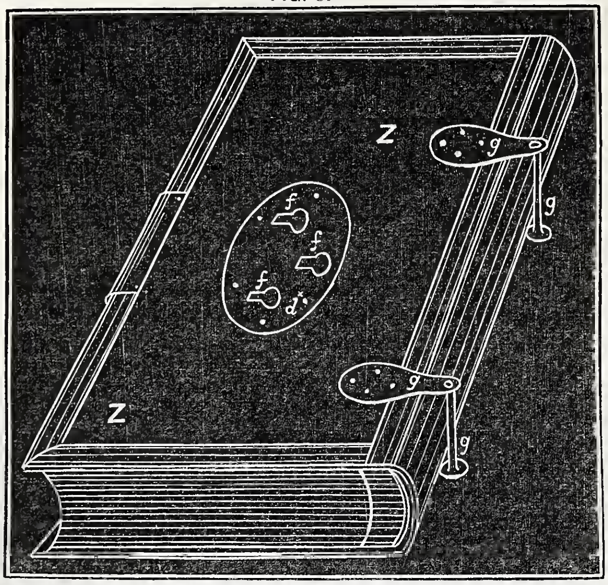


Fig. 5 shows the album Z detached from its stand in order that the plate *d*× and slots *f* may be clearly seen. The album may, however, if desired, be used detached from its stand like an ordinary album.

In order to prevent undue strain or injury to the back of the album when opened, I employ angle pieces *g*, which I rivet, screw, or otherwise attach to the under side or under cover of the album, and they extend under the back thereof, as seen in *figs.* 1 and 5, so that when the album is opened they form rests or brackets for the back, and keep it well supported.

The spindle or pivot may, of course, be fixed to the upper and revolving portion A, and the longitudinal orifice formed in the lower and stationary portion A×.

Although I have described the invention as applied to an album, it may be applied in obviously similar manner to ladies' companions, portfolios, and the like.

Having now described the nature of the said invention, and in what manner the same may be performed, I declare that I claim—

1. Constructing stands, supports, or standards for photographic albums, ladies' companions, and other like articles, in two portions, the upper portion carrying the article, and being capable of revolving on the lower and stationary portion, as described.

2. Fixing or attaching the album or other like article to the stand, support, or standard by means of hooks, studs, or other equivalent contrivances disposed on a plate, secured to the upper and movable portion of the stand, such hooks or studs engaging in a slotted plate fixed in the album or other article, as described.

3. The employment of angle pieces fitted to the album or other like article, and forming stays, supports, or brackets for preventing undue strain or injury to the back when such article is opened, as hereinbefore described.

4. The general arrangement and combination of parts constituting the improvements in the construction of stands or supports for holding photographic albums, ladies companions, and other like articles, as hereinbefore described and illustrated in the annexed drawings.

The ferrous oxalate developer, about which so much has recently been written, does not appear to be altogether free from the unpleasant and, at the same time, inexplicable, vagaries to which so many of our photographic chemicals are subject. In proof of this we may cite a personal experience. A quantity of the solution prepared a little over a month ago has been carefully preserved in a stoppered bottle, the latter being filled to the neck, and the more completely to avoid any chance of oxidation from atmospheric influence the glass stopper was coated with wax. A few days after preparation the solution commenced to deposit upon the sides of the bottle a dirty, yellowish-brown crystalline sediment. We did not attach much importance to this, but were unable to account for it, as the solution was made with *cold* water and was carefully filtered previous to bottling, so that it could not have been supersaturated originally, nor did there appear to be any possibility of such a state of affairs having arisen from evaporation. Upon opening the bottle a few days ago, however, the solution (which upon filtration exhibited no signs of having gone wrong) was found to be completely devoid of developing power. To such an extent was this the case that a plate purposely immersed in the solution for half-an-hour showed not the faintest trace of either image or fog. It was then washed carefully and treated with weak alkaline pyro., when a clean and vigorous image was rapidly formed. But the most surprising feature in the case is that another portion of *the same solution*, from which we had been working almost daily, and which had therefore received a good deal of exposure to the atmosphere, worked perfectly to the last drop, and was only finished on the same day that the reserve bottle was opened. The only difference in the circumstances connected with the two portions of the solution was that the one in constant use was diluted (after filtration) with half its bulk of water. Can it be that the concentrated solution is unstable, while in the diluted state it is endowed with keeping properties? If so, what is the change which occurs to deprive the solution of its power? We are trying the regenerating power of a coil of iron wire, as suggested by Mr. J. W. Swan, and trust it may prove effective.

A NEW SUBSTRATUM.

As so much attention is now being devoted to dry processes generally, and to washed emulsions with and without subsequent preservatives in particular, I hasten to call the attention of all dry-plate workers to a substratum which I believe to be new, and which is giving most satisfactory results in my hands.

I have been working a good deal lately with washed emulsion films treated with strongly-alkaline albumen, somewhat after the fashion of the excellent process introduced by Capt. Abney, and entitled *An Emulsion Process with Beer and Albumen*, and I have found a good substratum a great desideratum. For small plates, such as cabinet, no substratum is necessary, an edging of paraffine and india-rubber, dissolved in benzole and applied before development, being quite sufficient; but for larger sizes it becomes imperative if the highest class of negative be aimed at, owing to the excessive wrinkling of the film. The film is so expanded by the solutions during development that on drying it is apt to form ridges, which become more apparent on varnishing.

I tried all the known methods for holding the collodion film tightly to its glass support, including albumen of various strengths, gelatine, india-rubber dissolved in chloroform or benzole, and French chalk; but all without success. The strongly-alkaline albumen invariably so loosened the film that blisters made their appearance before the negative was finished.

One day, when almost in despair at the apparent impossibility of getting anything to answer, it occurred to me I had never tried gelatine rendered insoluble by means of chrome alum. I hastened to prepare some plates to try whether such a plan would be practically useful, and whether there were any drawbacks connected with it. My first trials were most encouraging, and I am now able to state that it answers most admirably under very trying circumstances. At first I rather feared the chrome alum might make the film less sensitive; but such is not the case. In fact, in some instances the presence of the substratum seemed to render the emulsion film slightly *more* sensitive.

I trust I may not be claiming as a novelty something which is not one; but, so far as I am aware, gelatine rendered insoluble by chrome alum has never before been used as a substratum for the collodion film.

And now to describe, in a very few words, how I have used it. I am not yet certain the proportions I have employed are the very best, many more experiments being necessary before that point can be determined. All I can say is they answer very well. I am just now trying the effect of varying the amount of aqueous dilution, and when my trials are complete will report progress. Soak sixty grains of Nelson's photographic gelatine in water, drain, and pour on enough boiling water to make eight fluid ounces. Now add two drachms of a ten-grain solution of chrome alum, and stir vigorously for a minute or two. Filter the solution through paper* into a clean measure, keeping it warm, and avoiding air-bubbles.

To save trouble a large quantity of each of the solutions—the gelatine and the chrome alum—may be prepared and will keep for a long time if a little pure carbolic acid be added to each. No more must be *mixed* than is required for the batch of plates, as when the compound solution has once become cold it cannot be again liquefied with heat. The measures and filter used must be well washed with warm water as soon as done with, for the same reason.

The cleaned plates are immersed in a dish of warm water. They are taken out one by one, attached to a pneumatic holder, swilled with warm water, and the surface flowed twice with the gelatine solution (which must *not* be returned to the pourer, but may be to the filter); and if care be used very little will run over the back of the plate.

After coating, the plates are placed in a light deal box, the bottom of which is covered with three or four thicknesses of clean filtering paper, in such a way that only one corner touches the side of the box. The lower edge rests entirely on the filtering paper.

Cover the box to exclude dust whilst the plates are drying. They are ready for use very soon, though they improve much by keeping for a day or two; hence it is advisable to prepare a good number at one time.

Although all this sounds troublesome it does not take so long to prepare the plates in the manner just described as it does to dry and polish them in the ordinary way, and I trust that all who may try the method may be as well satisfied with it as I am.

HENRY COOPER.

* Glass wool appears a better medium than paper. I have only tried it since the above was written, but prefer it much.—H. C.

OUR APPARATUS.

No. VII.

PRINT-WASHING APPARATUS.

CONTRIVANCES for washing silver prints are legion, and of all photographic appliances none have been more varied than those designed to effect this purpose. The fact was soon discovered that prints lying close together in a small quantity of water for the purpose of eliminating the deleterious soluble matters contained in them did not answer, even if allowed to remain soaking for several days. Design after design was submitted to the notice of photographers as the most perfect and efficacious plan; but so much depends upon the available water supply, both as to quantity and quality, no one plan could be practicable in all cases. Given, however, a constant and plentiful supply, a trough with a false bottom, regulating syphon, and flapper, worked by a water wheel to keep the whole in constant and slight motion, is, perhaps, as effectual a method as any. In a general way, unless silver prints are washed with a plentiful and continuous change of water their permanency is very doubtful. Prints may be freed from obnoxious soluble matter, providing each is carefully and thoroughly subjected to sponging with warm water, pressing and draining, frequently repeated; but where much work has to be got through the tediousness of such a process is the great bar to its adoption. Where the supply of water is limited, a vessel with a false bottom and regulating syphon to empty it once in every few hours, and the water supply forced through a pipe pierced with very minute holes against the side of the containing vessel to give a rotatory motion to the contents, answers very well if the prints are small—say not larger than cabinet size. The rotatory motion is apt to crumple up larger proofs and so spoil them. Any arrangement by which the proofs are kept in gentle motion, and the water frequently and thoroughly changed, will be found to be tolerably satisfactory.

BACKGROUNDS AND ACCESSORIES.

In these matters, perhaps more than in any other, the photographer has the opportunity of displaying his individual taste or want of it. Backgrounds are of several descriptions—the roller background, the revolving background, those stretched tightly on frames like huge painters' canvases, those arranged after the manner of curtains hung by rings on a rod, and the alcove form. The exigency of the situation generally determines the kind to be adopted. Nothing is better than canvas stretched on a frame and painted in oil colour or distemper—oil colour by preference, as being less liable to injury and more easily cleaned. If a *flatted* oil surface be desired it is almost a necessity that it should be of an uniform and even tint over the whole, the difficulty of blending shades nicely in *flatted* oil being almost insuperable. With ordinary oil painting this is easily managed, and any amount of shades and gradations may be worked on according to the taste of the photographer. The glazed surface of ordinary oil colour is unobjectionable, provided the background be set to lean forward a little at the top, so as to reflect any light falling on it on to the ground and not into the camera. The general effect on the photograph of a leaning background is preferable to one at right angles to the camera. This is especially noticeable if no accessories are used, giving more distance and doing away with that inlaid effect sometimes seen.

These remarks, of course, apply to plain backgrounds. If an interior or architectural design of any kind be painted on it the position must be upright. These designs are, unfortunately, very popular, and are purchased as being pretty things in themselves; but, generally speaking, as soon as a figure is introduced the balance of lines is upset, and an inartistic result is almost certain. Most of our leading men now thoroughly understand that the quieter and more subdued the background is the better. Plain or merely shaded surfaces are usually preferred, unless for some special purpose, as such cannot violate any particular canon of art, or by bad drawing and false perspective offend the eye of the educated critic.

Another objection to sham scenery is that, however accurate the drawing and good the lines with reference to the figure, unless the camera be perfectly level and at right angles to it the drawing will, of necessity, be distorted and bad effects produced. If we call to mind how very rarely this position is used, the camera being seldom kept at the same relative position with regard to the background for any two sitters consecutively, we shall at once see why a plain background is most suitable.

CARPETS.

A carpet of a very decided pattern, of whatever kind it may be, is quite unsuitable for the photographic studio. In selecting them care must be taken not only to avoid a too pronounced pattern but also to choose a good colour—one that will not photograph too dark or too light. A dull crimson (not red) is a nice colour, bearing in mind that any woollen material lying on the ground will come out several degrees lighter than the same hung up directly in front of the camera. A good stout felt drugget is as good as anything, from an artistic point of view, with no pattern on it to speak of. Green carpets are not suitable, as they reflect sufficient non-actinic colour to materially lengthen the time of exposure. The colour of the surroundings should be borne in mind when painting or upholstering a studio, as it has more influence in lengthening or shortening an exposure than one would imagine, unless they had tried it.

Having now reviewed most of the apparatus in general use in a photographic business, I can do little more than reiterate the directions—that care and cleanliness are of all things requisite to keep our apparatus in good and serviceable condition fit to produce those works of art which are the goal of the ambition of so many of us. I conclude by parodying the well-known lines of the immortal bard:—

Costly thy outfit as thy purse can buy,
But nothing sacrificed to ornament;
Well-seasoned and of sound construction,
For apparatus oft proclaims the man.

E. DUNMORE.

NOTES ON PASSING EVENTS.

BY A PERIPATETIC PHOTOGRAPHER.

A LEADERETTE in a recent number of this Journal, devoted to giving the details of a method of filtering, recals to my recollection a mode which was introduced by Mr. F. W. Hart ten or twelve years ago. I do not know whether or not the apparatus is now being manufactured, but I *am* aware of one who prefers it to all methods of filtering the silver bath. For the benefit of those who have entered the field of photography subsequent to the period at which I have hinted, I will give a brief description of this filter:—

In a glass jar or bottle having a *very* wide mouth is fitted a cover or bung containing two holes—one of them pierced through it near the centre, the other towards the margin. In this latter is inserted a glass funnel with its mouth uppermost, so as to permit liquids to be poured into the jar with ease. In the central hole is also inserted a glass funnel, but in this case it must be mouth lowermost, so that when the bung is inserted the mouth will be inside the jar; and, not only so, but the length of the funnel pipe must be such as to allow the mouth to reach within an inch of the bottom of the jar, while the small end stands an inch or two clear above the cork. The mouth of this latter, or inverted, funnel is covered by a cap of thin, close-grained felt, which is retained *in situ* either by an india-rubber band or, preferably, by a piece of string tied round it. To the upper or projecting small end of the funnel is attached an india-rubber tube (pure rubber being necessary for this purpose), the length of which is such that it must, when hanging down, reach to a slightly lower level than the bottom of the jar. To use this filter it is only necessary that the silver solution be poured into the jar through the funnel constructed for that purpose, and the flow of the silver is then started upwards through the felt-covered funnel. This can be effected by suction by the mouth, by an india-rubber ball, or by several other methods familiar to all acquainted with the principle of the syphon. The bath or receptacle into which the filtered solution is to run must, of course, be placed on a lower level than the shelf upon which the jar stands. At the end of a day's work the bath solution may be poured back into the jar as a stock receptacle, and sufficient be drawn off the next merning to suit the requirements of the day. This system is worthy of the highest commendation.

At the last meeting of the Photographic Section of the American Institute a subject of interest was brought under the notice of the members. The Secretary intimated that certain lenses in the possession of a friend of his had become much slower in action than they were eight or nine years ago. I may observe that this fault almost invariably arises from the lenses having been constructed of glass possessing a great degree of density. This description of glass possesses high refractive power, and if obtained quite colourless certainly confers upon the optician the ability to make his lenses with a slightly larger aperture, having, consequently, greater rapidity of action; but in course of time the glass, previously colourless, assumes a yellowish tint and becomes slower than before. In the case mentioned it was said that the lenses had been used for out-of-door work, and that they had been much exposed to light. In saying this, the sole cause of the change was hit upon with infallibility. It has been proved to demonstration, by Mr. Gaffield and others, that by exposing very dense glass to sunlight behind a mask having figures cut in it such figures will, in a very short time, become printed upon the glass in decided yellow tones. Query: is it the lead in the dense glass that renders it sensitive to light? or may it be attributed to a trace of silver having been introduced along with the lead?

It is a happy idea of Messrs. Johnson and Sarony to facilitate the preparation of eburneum pictures by keeping the eburneum material in sheets, to which the picture may be transferred. The old method —which consists of levelling the glass transparency and then pouring upon it enough of a solution of gelatine and white pigment to form when dry a translucent card capable of being handled—answers the purpose quite well; but it necessitates long waiting until the gelatine has set and become sufficiently dry to warrant its removal. While quite admitting, as I cheerfully do, the beauty of an "eburneum," I think that there is still room for improvement in the *plaque* itself. It is of too pronounced an *old* ivory tone of colour, the yellow character prevailing to an extent which would be better if lightened. But here arises the difficulty—in what way or by what means can a layer of gelatine of the thickness of a card, and holding in suspension throughout its substance a white pigment, be obtained in which the yellow colour shall be subdued so as to be at its minimum force? Would it not be possible to obtain some substance in which the colour will be less marked than gelatine? A castor-oil collodion containing sufficient zinc white to render it translucent might probably answer better; but I write this without having tried it.

At the age of sixty-six Herr Friedrich William von Voigtländer, the celebrated Brunswick optician, has been "gathered to his fathers." He enjoyed the reputation of being an operative optician of a much higher order than the majority of his continental brethren; indeed he belonged to a family who had been renowned as opticians for more than a century. In 1840 he became acquainted with Professor Petzval, from whose calculations and under whose directions he constructed the first double portrait combination, Petzval about that time also supplying the formulæ for the orthoscopic lens, which was brought out by Voigtländer seventeen years afterwards, and which was the occasion of much bitterness of feeling between these two noted men of science. Two years after he became acquainted with Petzval he introduced the twelve-lens opera-glass, which has, for the better class of instruments, entirely superseded the pre-existing kind. He has been described as a stately, imposing-looking man, with a florid complexion and long red beard. He was the recipient of several national honours and distinctions during his lifetime. His son, who bears the same name, continues to carry on the business.

(To be continued.)

THE PHOTOGRAPHIC PRINTING PROCESS USED IN THE PORTUGUESE STATE PRINTING ESTABLISHMENT.*

VI.—Heliogravure after the Copperplate Style.

A.—Chromated Gelatine Process.

Reproduction (Without Half-Tones) of Engravings, Printed Matter, Manuscripts, and soforth.

A perfectly level and polished copper plate is coated with chromated gelatine. To dry the films a very simple apparatus is used, consisting of a sheet of cast iron seventy-five centimetres wide, moved quickly or slowly about in a box by means of a crank. Under this movable sheet of iron several gas burners are placed, and the gelatinised plate is laid on the iron and moved about until the film is dry.

The exposure is given either in the sun or by electric light (produced from a Gramme's machine) under a positive *cliché*. The electric light is preferable, as it furnishes extremely sharp and very fine prints. The *cliché* must be very good, but it is not necessary that it should present such sharp contrasts as are required for photolithography—these, indeed, are here rather objectionable than otherwise; still the *cliché* must be pretty powerful and rich in details.

The picture is etched with chloride of iron, which, on the one hand, renders the gelatine insoluble, and, on the other, attacks the copper in inverse proportion to the action of the light. The perfectly-lighted parts of the gelatine act like an etching-ground. If there are both very broad and very fine lines in the drawing the former will not be broad enough to print from; one must then either deepen them with a graver or etch these lines again in the manner to be hereafter described.

Reproductions from Nature: Engravings with Half-Tones.

This time the level and polished plate is first dusted equally over with finely-pulverised resin, and then gently warmed in order to make the resin sticky and cause it to adhere to the plate. The latter is then coated with chromated gelatine in the usual way.

The exposure under the positive *cliché* takes place either in the sun or by electric light. The back and corners of the plate are varnished, and any retouching that may be required is given. The plate is now placed in a solution of chloride of iron, which quickly penetrates the gelatine in the unexposed parts—more slowly the half-tones—and leaves the fully-lighted parts unchanged. The resinous powder lying upon the metal gives a fine granularity of texture, without which the picture could not be printed. The resinous powder, however, does not, unfortunately, admit of getting at the same time both powerful tones and delicate half-tones. The picture is seldom sufficiently dense, and when that is the case the outlines are almost always of exaggerated sharpness. This principally arises from the fact of the granularity of the plate not representing with the same good effect the different parts of the picture. This fault may be somewhat lessened by biting in the stronger tones with a strong solution of chloride of iron, and the half-tones with a weaker solution; or, better still, by etching the same plate twice, for which two *clichés* will be required, differing only in the amount of contrast in the tones that they offer: one must be weak and one strong. It should, however, be remarked here that on account of the exactitude with which the two pictures have to be placed one above the other this double operation presents great difficulties, and can only be successful in the hands of a very skilful operator.

According to the latest experiments an insoluble, dark granular substance may be added directly to the chromated gelatine without affecting either the gelatine or the chloride of iron. (Pounded earthenware has stood the test.) By this procedure the details are more perfect, and the whole is richer and finer than when powdered resin is used.

B.—Asphalte Process.

Reproductions of Pen and Ink Drawings, Prints Without Half-Tones, Manuscripts, &c.—When there is a question of reproducing very fine work it is decidedly best to work according to the chromated gelatine process given under the heading A. Geographical charts, maps, and that sort of thing turn out best with asphalte.

A solution of asphalte in benzine and oil of lavender should be prepared of such a consistency that this varnish, even when thinly put on, resists the etching water. It is poured like collodion over the copper plate, and dried with warmth. This plate is exposed under a *cliché*, either in the sun or by electric light. Should the plate, after being exposed, be still warm, it must first be allowed to become cold, and then be dipped into turpentine until all the asphalte which has not been affected by the light is dissolved. When the drawing stands out clear, then proceed to etch it with aqua fortis.

* Continued from page 232.

Zinc Etching in Relief.

The object of this process is the production of a metallic *cliché*, which may be used with type in the letterpress printing press; that is, may replace the as yet generally-used woodcut. The drawing may be produced on the asphalte with chromated gelatine directly either by hand or by photography, or by transferring a fatty picture which serves to resist the etching.

In all these various cases the drawing must be strengthened, either by a special covering or in some other way before etching. The work is then almost limited to repeated rolling with ordinary lithographic rollers after each time of etching, however slight, over those parts of the metal sufficiently bitten in by the acid, in order to protect them from its further action. The further the etching proceeds the more difficult does this rolling become, because the ink must be forced as far as necessary into the hollows.

For this purpose an oven, having a cast-iron plate, is used as a table; this plate should not be made hotter than 200° C. During the rolling the zinc plate should be laid upon this hot plate. The ink then sinks because the heat makes it more fluid, and so it runs down and fills the finer hollows. The nitric acid must be used diluted at first, and for each succeeding etching it should be taken a little more concentrated. All the time the acid is etching it must be kept moving evenly, and as long as the plate lies in the etching tray the latter should be turned round regularly, either by hand or by a small steam engine.

When the first etching has gone on long enough the zinc plate is taken out of the tray and washed with a brush with benzine, turpentine, or petroleum, and a weak solution of caustic potash or caustic soda. It is then dried upon the not very hot plate of the oven and rolled, but only until the finest lines are filled with the grounding ink. It is then etched again, and one goes on alternately coating with ink and etching until the drawing stands out in sufficiently high relief. The faulty parts must then be corrected and retouched. The plate is now ready to be mounted upon wood, and printed in the letterpress printing press, where thousands of proofs may be pulled from it.

In the following paragraphs a few words will be said of Gillot's high relief etching process, which is now used in many establishments.

Typographic Heliogravure.

For this process a zinc plate furnished with a coating sensitive to light is exposed under a negative. It is the quickest and cheapest process.

It is very important that good metal should be chosen; and the plates must be made *very level*, so as to lie close to the negative and to be equally rolled. The zinc also must be homogeneous in texture, so that the acid may act equally upon it. It must be very compact and have no rents, and it is well to beat it before using it, as that lessens the porosity of the metal and makes it stronger.

It is easily known whether the plate is flat enough if one look at the image of the picture as reflected in its upper surface and bounded by certain lines.

The thickness of the plate may be varied from one to three millimetres; the larger the picture and the greater the distance between the lines the thicker the plate should be. Too thin plates are often difficult to fasten down to the wood. José Julio Rodrigues.

(To be concluded in our next.)

COMPOSITE PORTRAITS,

MADE BY COMBINING THOSE OF MANY DIFFERENT PERSONS INTO A SINGLE RESULTANT FIGURE.*

The best instrument I have as yet contrived and used for optical superimposition is a "double-image prism" of Iceland spar. The latest that I have had were procured for me by Mr. Tisley, optician, 172, Brompton-road. They have a clear aperture of a square half an inch in the side, and when held at right angles to the line of sight will separate the ordinary and extraordinary images to the amount of two inches, when the object viewed is held at seventeen inches from the eye. This is quite sufficient for working with *carte-de-visite* portraits. One image is quite achromatic, the other shows a little colour. The divergence may be varied and adjusted by inclining the prism to the line of sight. By its means the ordinary image of one component is thrown upon the extraordinary image of the other, and the composite may be viewed with the naked eye or through a lens of long focus or through an opera-glass (a telescope is not so good) fitted with a sufficiently long draw-tube to see an object at that short distance with distinctness. Portraits of somewhat different sizes may be combined by placing the larger one further from the eye, and a long face may be fitted to a short one by inclining and foreshortening the former. The slight fault of focus thereby occasioned produces little or no sensible ill-effect on the appearance of the composite.

The front and profile faces of two living persons sitting side by side or one behind the other can be easily superimposed by a double-image prism. Two such prisms set one behind the other can be made to give four images of equal brightness, occupying the four corners of a rhombus, whose acute angles are 45°. Three prisms will give eight images; but this is practically not a good combination. The images fail in distinctness, and are too near together for use. Again: each lens of a stereoscope of long focus can have one or a pair of these prisms attached to it, and four or eight images may be thus combined.

FIG. 1.

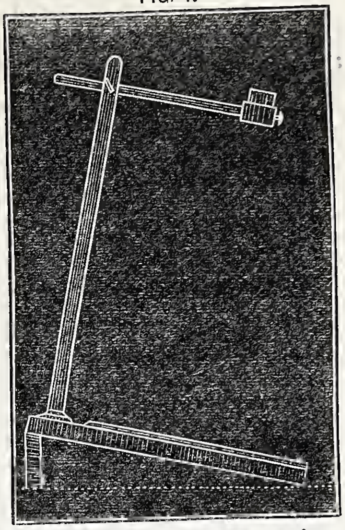
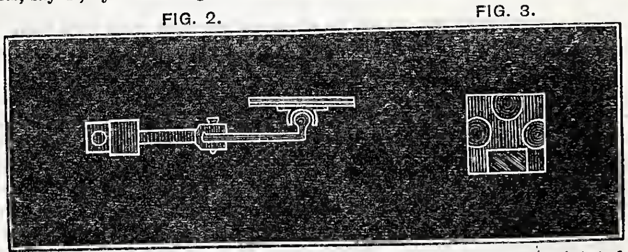


Fig. 1 shows the simple apparatus which carries the prism and on which the photograph is mounted. The former is set in a round box which can be rotated in the ring at the end of the arm and can be clamped when adjusted. The arm can be rotated, and can also be pulled out or in if desired, and clamped. The floor of the instrument is overlaid with cork covercd with black cloth, on which the components can easily be fixed by drawing-pins. When using it one portrait is pinned down and the other is moved near to it, overlapping its margin if necessary, until the eye looking through the prism sees the required combination; then the second portrait is pinned down also. It may now receive its register marks from needles fixed in a hinged arm, and this is a more generally applicable method than the plan with cross threads, already described, as any desired feature—the nose, the ear, or the hand—may thus be selected for composite purposes. Let A, B, C, . . . Y, Z, be the components. A is pinned down, and B, C, . . . Y, Z, are successively combined with A, and registered. Then before removing Z take away A, and substitute any other of the already registered portraits, say B, by combining it with Z; lastly, remove Z and substitute A by combining it with B, and register it. *Fig.* 2 shows one of three similarly-jointed arms, which clamp on to the vertical rod. Two of these carry a light frame covered with cork and cloth, and the other carries *fig.* 3, which is a frame having lenses of different powers set into it, and on which, or on the third frame, a small mirror inclined at 45° may be laid. When a portrait requires foreshortening it can be pinned on one of these frames and be inclined to the line of sight. When it is smaller than its fellow it can be brought nearer to the eye and an appropriate lens interposed. When a right-sided profile has to be combined with a left-handed one it must be pinned on one of the frames, and viewed by reflection from the mirror in the other. The apparatus I have drawn is roughly made, and being chiefly of wood is rather clumsy, but it acts well.

FIG. 2. FIG. 3.



Another instrument I have made consists of a piece of glass inclined at a very acute angle to the line of sight, and of a mirror beyond it, also inclined, but in the opposite direction to the line of sight. Two rays of light will therefore reach the eye from each point of the glass; the one has been reflected from its surface, and the other has been first reflected from the mirror and then transmitted through the glass. The glass used should be extremely thin, to avoid the blur due to double reflections; it may be a selected piece from those made to cover microscopic specimens. The principle of the instrument may be yet further developed by interposing additional pieces of glass successively less inclined to the line of sight, and each reflecting a different portrait.

I have tried many other plans; indeed, the possible methods of optically superimposing two or more images are very numerous. Thus I have used a sextant (with its telescope attached); also strips of mirrors placed at different angles and their several reflections simultaneously viewed through a telescope. I have also used a divided lens, like two stereoscopic lenses brought close together, in front of the object-glass of a telescope.

* Concluded from page 258.

I have not yet had an opportunity of superimposing images by placing glass negatives in separate magic-lanterns, all converging upon the same screen; but this or even a simple dioramic apparatus would be very suitable for exhibiting composite effects to an audience, and if the electric light were used for illumination the effect on the screen could be photographed at once. It would also be possible to construct a camera with a long focus, and many slightly-divergent object-glasses, each throwing an image of a separate glass negative upon the same sensitised plate.

The uses of composite portraits are many. They give us typical pictures of different races of men, if derived from a large number of individuals of those races taken at random. An assurance of the truth of any of our pictorial deductions is to be looked for in their substantial agreement when different batches of components have been dealt with, this being a perfect test of truth in all statistical conclusions. Again: we may select prevalent or strongly-marked types from among the men of the same race, just as I have done with two of the types of criminals by which this memoir is illustrated.

Another use of this process is to obtain by photography a really good likeness of a living person. The inferiority of photographs to the best works of artists, so far as resemblance is concerned, lies in their catching no more than a single expression. If many photographs of a person were taken at different times, perhaps even years apart, their composite would possess that in which a single photograph is deficient. I have already pointed out the experience of Mr. Appold to this effect. The analytical tendency of the mind is so strong that out of any tangle of superimposed outlines it persists in dwelling preferably on some one of them, singling it out and taking little heed of the rest. On one occasion it will select one outline, on another a different one. Looking at the patterns of the papered walls of our room we see, whenever our fancy is active, all kinds of forms and features; we often catch some strange combination which we are unable to recal on a subsequent occasion, while later still it may suddenly flash full upon us. A composite portrait would have much of this varied suggestiveness.

A further use of the process would be to produce from many independent portraits of an historical personage the most probable likeness of him. Contemporaneous statues, medals, and gems would be very suitable for the purpose, photographs being taken of the same size, and a composite made from them. It will be borne in mind that it is perfectly easy to apportion different "weights" to the different components. Thus, if one statue be judged to be so much more worthy of reliance than another that it ought to receive double consideration in the composite, all that is necessary is to double either the time of its exposure or its illumination.

The last use of the process that I shall mention is of great interest as regards inquiries into the hereditary transmission of features, as it enables us to compare the average features of the produce with those of the parentage. A composite of all the brothers and sisters in a large family would be an approximation to what the average of the produce would probably be if the family were indefinitely increased in number, but the approximation would be closer if we also took into consideration those of the cousins who inherited the family likeness. As regards the parentage, it is by no means sufficient to take a composite of the two parents; the four grandparents and the uncles and aunts on both sides should be also included. Some statistical inquiries I published on the distribution of ability in families* give provisional data for determining the weight to be assigned in the composite to the several degrees of relationship. I should, however, not follow those figures in the present case, but would rather suggest for the earlier trials first to give equal "weights" to the male and female sides; thus the father and a brother of the male parent would count equally with the father and brother of the female parent. Secondly, I should "weight" each parent as four, and each grandparent and each uncle and aunt as one. Again, I should weight each brother and sister as four, and each of those cousins as one who inherited any part of the likeness of the family in question. The other cousins I should disregard. The weights as previously mentioned would be bestowed by giving proportionate periods of exposure.†

Composites on this principle would undoubtedly aid the breeders of animals to judge of the results of any proposed union better than they are able to do at present, and in forecasting the results of marriages between men and women they would be of singular interest and instruction. Much might be learnt merely by the frequent use of the double-image prism as described above, which enables us to combine the features of living individuals when sitting side by side into a single image.

I have as yet had few opportunities of developing the uses of the composite photographic process, it being difficult without much explanation to obtain the requisite components. Indeed, the main motive of my publishing these early results is to afford that explanation, and to enable me to procure a considerable variety of materials to work upon. I especially want sets of family photographs all as nearly as possible of the same size and taken in the same attitudes. The size I would suggest for family composites is that which gives one-half of an inch interval between the pupil of the eye and the line that separates the two lips. The attitudes about which there can be no mistake are—full face, an exact profile (say), always showing the right side of the face, and an exact three-quarters, always showing the left; in this the outer edge of the right eyelid will be only just in sight. In each case the sitter should look straight before him. Such portraits as these go well into *cartes de visite*, and I trust that not a few amateur photographers may be inclined to make sets of all the members of their family, young and old and of both sexes, and to try composites of them on the principles I have described. The photographs used for that purpose need not be in the least injured, for the register marks may be made in the case into which they are slipped, and not in the photographs themselves.

FRANCIS GALTON, F.R.S.

* *Hereditary Genius*, p. 317. Column D. Macmillan, 1869.

† Example:—There are five brothers or sisters and five cousins whose portraits are available: the total period of desired exposure is 100 seconds. $5 \times 4 + 5 = 25$; $\frac{100}{25} = 4$; which gives $4 \times 4 = 16$ seconds for each brother or sister, and four seconds for each cousin ($5 \times 16 + 5 \times 4 = 100$).

A TRIO OF SUGGESTIONS.

OUTSIDE of the absolutely necessary paraphernalia of a photograph gallery, I would suggest as one of the most useful a good, reliable amateur printing press, with from six to a dozen, or even more, small founts of various size and styles of types. Woodcuts and electrotypes are now made very cheaply from any design furnished. Photographers can have special designs of their own always ready for printing the ends of their stereo. views, backs of card-mounts, &c., in just as neat a manner as they can be executed by most practical printers, if proper care be taken. For printing envelopes, business cards, circulars, and the thousand and one things of the sort required about the gallery, it will save itself over and over again every year. A "Novelty," in use in our gallery since 1873, has not cost a penny for repairs, and still works like a charm. About twenty founts of type and as many electrotypes have accumulated. In nearly every establishment one can be found who will delight to work it.

Another very essential article, not only in the gallery but any business place, is the letter copying press, or one of the various copying books that require no press, several of which I know from practical experience do their work. Much inconvenience and annoyance is avoided by keeping copies of all letters and orders, and not unfrequently cash is saved and made.

Lastly, and to complete the trio, I would suggest, as almost indispensable, a good clothes-wringer—not to wring your pictures through ten or fifteen minutes after they came from the hypo., as I have seen recommended, for that is all bosh, but after they are thoroughly washed. Take from the water one at a time, and place on top of others till you have three or four dozen, put between two pieces of cardboard, or, better still, between one piece *folded*, pass through the wringer, and mount in that condition if prints have been cut before toning; if not, hang up or spread out to dry. Pictures wrung out dry in half the usual time. And now, perhaps, it would be well enough to "suggest" that the writer has no interest in the sale of any of these articles, but does have an interest in the welfare of his fellow-craftsmen, and is always ready to contribute anything that may be of value to them. W. H. TIPTON.

—*Phil. Phot.*

ROYAL INSTITUTION LECTURES.

COMPOUND COLOURS.—COLOUR BLINDNESS.

LORD RAYLEIGH began his fourth and concluding lecture on Thursday, the 23rd ult., by showing that a combination of yellow and blue liquids produced green, and then explained that the result was due to the impurity of each colour, and that if they had been absolutely pure the mixture would have been colourless. Various methods of combining colours were then exhibited. Thus, with polarised light, greenish-yellow and reddish-yellow gave white. With Professor Clerk Maxwell's apparatus two or three slits produce two or three spectra, and by their overlapping definite portions of the spectra may be mixed. The colours thus formed, or the white light thus produced, may be resolved by the prism into the component parts, and do not give a continuous spectrum. Lord Rayleigh said that red and yellow might be supposed to produce orange, the colour of the spectrum between them, and Maxwell's experiments support this idea; but going upwards from the red, the intermediate colours are not always produced by mixture. Thus, purple—a combination of red and blue—is not represented in the spectrum at all. The yellow of the spectrum can be exactly imitated by mixing red and green, and with due proportions of those colours all the shades of yellow and orange; hence it is concluded that green and not yellow is a primary colour. By rotating discs with sectors of red and green a match was produced of yellow, white, and black; and his lordship obtained a yellow liquid by the mixture of chemical solutions, bichromate of potash (red), and litmus (blue). This colour, when passed through a prism, gave red and green, without yellow, on the screen. To specify any colour three elements are required—purity, depth (by black), and tint (by white). The three colours in the spectrum by which all others can be produced are red, green, and blue; but these colours, his lordship said, are not quite primary. In regard to the sensation of colour, reference was made to Dr. Thomas Young's theory that we have three sets of nerves—for red, green, and blue respectively, the degree of colour of the body looked at depending upon the amount of excitation of each of the sets of nerves. The threefold character of colours favours this view; but the explanation must be sought in the eye itself, as no one colour can be pre-eminently termed primary, and Helmholtz has proved that the sensation of colour partly depends on the state of the eye itself. Thus, after it has been fatigued by gazing on red and blue, the eye will be more excited by green. In the peculiarity termed "colour blindness" blue and green are the only sensations produced in the eye, and to these all tints are referred. To persons who have this defect scarlet geraniums and their leaves are alike in colour, and yellow is dark. Their eyes are not affected by any compound colour into which red and blue enter. This was strikingly illustrated by the rotation of discs to produce matches of colour, selected by a colour-blind person. The colours which appeared green and blue to him were pink and pale blue to persons with normal sight. With these interesting experiments the course was closed.—*Illustrated London News.*

Our Editorial Table.

American Pictures, Drawn with Pen and Pencil. By the Rev. Samuel Manning, LL.D.

London: The Religious Tract Society.

With the work above named we associate in this notice several stereoscopic and other photographic views in America received from Messrs. George Mason and Co. as productions of the camera of Mr. Joseph Collier, formerly of Inverness, and others received (some time ago) from Messrs. Anthony and Co., of New York.

We are placed at a great disadvantage in the examination of views of foreign places and scenes by a want of knowledge as to the nature and history of such scenes, and we felt this in a special degree in the case of Mr. Collier's views, taken during a tour in the Rocky Mountains—a tour made amid scenes replete with romance, and not free from great danger. The outfit of Mr. Collier for his photographic outing contained provisions for two months, with everything likely to be required on an arduous journey over unknown regions, including a miniature tool chest, needles, darning needles, thread, worsted, buttons, and similar articles. He and his companion were armed to the teeth, carrying a revolver attached to each saddle pommel, a large sheath knife, used for all purposes, a rifle packed somewhere handy, and a heavy whip. During this excursion our friend had not only to take photographs but to discover the subjects suitable for photographing—no easy matter in a country almost uninhabited save by rattlesnakes and by other equally pleasant "natives."

The large collection of stereoscopic photographs obtained by Mr. Collier during his long sojourn in the Rocky Mountains and their vicinity possesses a singular degree of interest in themselves as pictures; but there was still something wanting, and that "something" is most ably supplied in the volume now before us. It contains numerous illustrations, which are, for the most part, skilfully and faithfully drawn from photographs, of which, thanks to Messrs. Anthony and Co. and Messrs. Mason and Co., we possess copies. In *American Pictures* we find a graphic account of that strangely-wild and picturesque "Garden of the gods," in the vicinity of Denver; of the Californian geysers; of the Yosemite Valley; and the Yellowstone River, with its hot springs, its falls, its giant geysers, and its gorges. The scenes from Chicago to Niagara, those in the "New El Dorado," in Boston and New England, in the Empire State, in Philadelphia, and Washington are all here illustrated with a profuseness we have rarely seen equalled, the engravings being most effectively done. A book so replete with descriptive matter of scenes such as we have hinted at imparts a double value to the photographs we have alluded to, although, in an illustrative sense, the volume is complete in itself.

Rouch's New Negative Collodion.

London: W. W. Rouch and Co.

This collodion, we are informed, is the outcome of numerous experiments made with different descriptions of pyroxylines and various haloids having different bases, all being mixed together in different proportions. Seeing that several hundreds of changes can be rung upon these materials we can very easily understand the numerous experiments that may be involved in the elimination of any one of the numerous items that interfere in obtaining perfection—a quality which is, of course, unattainable unless a very low standard be set up.

Of the sample of Rouch's new collodion, upon which we have been requested to give our opinion as we find it, we are able to say that, mechanically, it flowed easily and gave a clear, even, structureless film—a matter in the determination of which we called in the aid of the microscope. Having sensitised plates by means of a thirty-five-grain bath, we obtained a film possessing the acme of uniformity; and on exposing plates thus prepared in the camera we obtained, with a very brief exposure, negatives which were as rich and full of detail as any that we could desire to see. There is a bloom and vigour about them which is very attractive. We are unable at present to institute a comparison between the "new" and the previous collodions of Messrs. Rouch and Co., but from our recollection of the latter we recognise in the new claimant for public favour certain qualities not wholly possessed by its predecessor, and for this reason we expect that this collodion will secure a large share of public favour.

Phantom Flowers, and How to Produce Them.

By Mrs. D. H. Cussons, Southport.

With the appropriate motto attached—"A thing of beauty is a joy for ever"—several stereoscopic views of skeletonised leaves, tastefully arranged, secured upwards of fifteen years ago a large share of public favour. Such leaves are most assuredly "things of beauty," and it is scarcely to be wondered at if their production occupies many of the leisure hours of the fair sex, for this kind of work tends to elevate the taste and refine the feelings of those who engage in it.

Mrs. Cussons, the authoress of the *brochure* before us, is entitled to speak with all the force conceded to an artist who has received both the silver and the gold medals of the Royal Horticultural Society for the technical perfection and artistic grace of arrangements of skeletonised leaves; and in *Phantom Flowers* we find many useful hints upon the method of producing these fairy-like forms. There is a very useful table given from which we ascertain the time approximately required for boiling the various classes of leaves mentioned in order to their being skeletonised. We should have preferred that the talented authoress had not been so reticent in giving formulæ for the preparation of the liquid itself; but we may state that we have seen several exquisite results obtained by boiling the leaf in a strong solution of the common washing powder that is sold in halfpenny and penny packets. Mrs. Cussons says:—

> "We can imagine no more fascinating work for leisure hours in the country than that of dissecting leaves or capsules for household or dress ornamentation. Let the amateur first aim at securing perfect specimens. It may be admitted that even imperfect leaves, when purely bleached and nicely mounted, form pleasing objects; but we say—never rest satisfied with anything short of absolute perfection in anatomy and colour; then strive to display your specimens in an artistic and elegant form."

We cordially endorse these sentiments.

Non-Actinic Muslin.

London: J. Solomon, 22, Red Lion-square.

The non-actinic muslin introduced some years since by Mr. Solomon has for a long period satisfied the requirements of photographers, especially those who have practised the wet collodion process; but within the last two or three years and now, in consequence of the greater use of bromides than previously, a demand has been made for diaphanous material of a still more non-actinic nature than before.

It is easy to perceive that the yellow and orange light, under which iodised films have been worked, is quite unsuited for the experimentalist with the extremely sensitive preparations which are now being so extensively employed; and Mr. Solomon, to keep pace with the times, has entirely changed the colour of his non-actinic muslin. A sample which we have received is of a peculiar ruby-orange colour, which, upon trial, we have found highly effective as a medium through which to admit light into the operating room. The muslin is merely the textile basis upon which is spread a flexible substance, like oxidised oil of a deep ruby colour, and which is highly transparent. This material is very handy for extemporising a dark room in any place where such is required; for, from its transparency and flexibility, it can be adapted to almost any conceivable circumstances connected with lighting. For example: a piece of cardboard may be bent round like a cylinder to surround a candle, and an aperture cut in this, and "glazed" with the muslin, provides a safe means of illumination for manipulating even the most sensitive plates. Or a window totally obscured by means of brown paper can have an aperture of any desired dimensions fitted with the muslin, which will thus admit a sufficiency of daylight by which to see to work, shorn of all its chemical influences. The various trials to which we have subjected the muslin prove that it is an appliance of a most useful character.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 11	Photo. Society of Great Britain	5a, Pall Mall East.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The usual monthly meeting of this Association was held on Thursday evening, the 30th ult., at the Free Public Library, William Brown-street,—Mr. H. A. Wharmby, President, in the chair.

The minutes of the previous meeting were read and confirmed.

Mr. W. E. Potter exhibited two prints from the same negative, the one being so decidedly superior to the other that Mr. Potter was asked to explain how the difference arose. He said that on varnishing the negative it proved insufficiently intense, giving a weak print with no contrast. Following the advice of the President he heated some alcohol by placing the bottle in hot water, and when sufficiently warm poured the alcohol on and off the negative until the varnish was all dissolved off the plate. When this was the case—which he ascertained by dropping a drop into cold water without producing milkiness—he proceeded to intensify the negative while still wet with pyrogallic acid and silver in the usual manner. He (Mr. Potter) found no difficulty in taking off the varnish and intensifying, and was delighted at the manifest improvement of the negative, for which he had carried his camera a bicycle journey of over forty miles to obtain.

The Rev. T. B. Banner exhibited some prints from Liverpool collodio-bromide plates which had been prepared ten years ago. They developed easily, and showed excellent keeping qualities without having lost their sensitiveness.

It was decided to defer the visit to Speke Hall until July, when an excursion could be made there instead of the usual monthly indoor meeting.

Several of the members related their photographic experiences at home and abroad, and the meeting was adjourned until the 27th inst.

Correspondence.

The Transit of Mercury.

It affords me much pleasure to be able to transmit to you the report to the Minister of Public Instruction of the observations made in Ogden, California, which, under date of May 7th, has just been received here. This report is signed "Ch. André," and is as follows:—

Monsieur le Ministre,—I have the honour to address to you the summary report of the observations made at Ogden on the 6th of May. The general plan that we adopted was the following:—

1. *Direct Observation of the Phenomenon.*—M. Halt, Hydrographic Engineer of the Marine, and myself had at our disposal, each of us, an equatorial of six inches in diameter. The observation of the first internal contact was for the purpose of ascertaining whether the black ligament, black drop, or bridge produced itself necessarily when the whole of the six inches opening was used and the solar image received by the eye in all the intensity that this organ can support; whether its dimensions and its intensity increased when the opening of the lens was diminished; and, finally, if we could reduce at our will the dimensions and intensity of the ligament in gradually increasing the absorptive power of the blackened glass employed for the observation. The observation of the second internal contact ought to have served to complete the results of the first internal contact, and to try a screen of a particular nature formed of narrow rings or diaphragms alternately open and closed, and which former experiments lead me to believe excellent for the purpose. The external contacts ought, besides, to be watched with care, and during the duration of the passage each of us were to examine the surfaces of the sun and of Mercury, and especially the environs of the solar disc in the whole of the space surrounding the planet.

2. *Photographic Observations.*—The photographic observations were directed by M. Angot, Professor of Physics at the Lyceum Fontanes. M. Angot proposed to compare the two results of the French photoheliograph and that which the American astronomers had employed during the last passage of Venus, as well as the different processes which were habitually used for such observations, and, finally, to study the influence that the duration of exposure can have in this case upon the sharpness of the images. M. Angot took charge of the photoheliograph, and confided the American instrument to Mr. Francis Klett, Civil Assistant of the Geographic Service of the United States, to the west of 100° meridian, and to Mr. Hoffman, photographer, of Ogden.

The state of the sky did not permit us to realise entirely the above programme—at least for the direct observation. In fact, on the afternoon of Sunday, the 5th, the weather, which for a week had remained fine, suddenly changed, a strong wind sprung up, bringing to us clouds of dust and sand, and the heavens were covered. The barometer fell rapidly, and we were soon obliged to nail the canvas roofs of the cabins and observatories, which up to that time had been fixed with cords, and which the wind now threatened to carry away. During the night a little snow fell; nevertheless, at four o'clock on Monday morning the heaven was bright and the wind had nearly ceased, the barometer had risen, and we thought that the storm was ended. But towards 6.30 a.m. the clouds again invaded the sky, and at 7.30 the snow recommenced to fall in small flakes. We saw Mercury, notwithstanding, several minutes after its entry upon the solar disc. At eight o'clock the snow fell abundantly, the wind rose again very violently, and we were in the middle of a hurricane—no longer of sand like the day before, but of snow; and, as on Sunday, we were obliged to closely nail down the roofs of our cabins. This horrible weather lasted until 11.45; a gap then appeared in the clouds, and M. Angot was able to take several photographs. From this moment the weather improved, little by little; the openings in the clouds became more and more frequent and lasted longer, but never, during the whole duration of the passage, was the sky entirely clear. Towards 2.45 a great gap was made in the vicinity of the sun, and, the moment of the final contact of Mercury approaching, hope returned to us. We were not deceived. That part of the sky around the sun remained pure until the final issue of Mercury, which we observed under excellent conditions, but a minute after the observation of the external contact and separation the sun was again concealed by the clouds.

As the results of the direct observation—our non-ability to see the entry having modified our first programme—our efforts were directed to the study of the black ligament. M. Halt made use of the full aperture of his equatorial. At 3h. 14m. 9s. (Ogden time) he perceived the first trace of the ligament. It was then a simple obscure train reuniting the margin of Mercury to that of the sun. Bringing, then, in front of his eye a portion of the graduated black glass, he saw the ligament disappear. Soon after it reappeared, and he made it disappear again by the same means, and so on alternately, until the moment when the two celestial bodies appeared in actual contact at 3h. 14m. 28s.

I had reduced down to four inches the six inch opening of my equatorial. At 3h. 14m. 5s. I saw the first trace of the ligament. After the lapse of several seconds it became very large and very obscure, comparable sensibly in dimensions to those of the diameter of the planet itself. Upon removing the diaphragm I saw the ligament reduce itself more than half; but on replacing the diaphragm, and then using a graduated blackened glass, I made the black ligament to disappear. The two stars then appeared very sharply, distant one from the other. Restoring the darkened glass to its original position the ligament reappeared very large and very intense, and this was repeated a second time with the same results. At 3h. 14m. 32s. the two stars appeared in contact.

These two observations appeared to me to resolve the first part of the programme enunciated above; and, in employing the simple and methodical plan which M. Halt had used during the observation of a contact of Venus, but was much more easy than that of a contact of Mercury, it seemed to me to attain an *approximation of at least two seconds of time*.

We have not remarked anything particular, neither on the planet nor upon the regions of the sun which surrounded it successively.

The Exit.

1st contact,	3h. 14m. 32s.	M. André.
"	3h. 14m. 28s.	M. Halt.
2nd contact,	3h. 17m. 18s.	M. André.
"	3h. 17m. 26s.	M. Halt.

The Photographic Observations.—An accident which occurred during the storm of Sunday to the photographic apparatus, which the astronomers of Washington had lent to M. Angot, prevented him from employing it during the brief period that the sky was clear, so the number of photographs obtained with this instrument was restricted to thirty. With the photoheliograph, on the contrary, profiting by all the gaps in the sky, M. Angot has been able to obtain forty-eight photographs of the phenomenon. Thirty of them have already been examined, and even those which have been taken when the sun was veiled by light clouds are good. Precise measurements alone will permit an exact opinion to be formed upon the relative value of the two instruments and of the different processes employed. This requires much time. M. Angot will commence these measures as soon as he returns to France, and he will have the honour to communicate to you the results and the conclusions to be drawn.

To the foregoing report I have merely to add a word of explanation. In the original the term "different *collodions*" has been employed, but as it is obvious that *processes* were meant I have adhered to the latter term.
W. Harrison.

Asnières (Seine), June 3, 1878.

Gelatine and Chrome Alum.—Carbon Printing at the Antipodes.—What is Art?

I have just been making a few experiments with some gelatine and chrome alum. Many, I daresay, have remarked how different samples of gelatine take the latter substance, and oftentimes I have found out too late that I had too much chrome alum present, although using the same formula as usual. Having with me two or three samples of Nelson's gelatine and one of Swinbourne's patent gelatine, I made a solution of each of the strength of two drachms of gelatine to two and a-half ounces of water. The temperature of my room was 84° F., and the water bath in which they were dissolved and mixed 104° to 108°. The accompanying table will give you the results. Of course this does not say much, as solutions of a more concentrated form would, in all probability, take less in proportion to the amount of gelatine.

Nelson's Opaque.	Nelson's Amber.	Nelson's Flake—1.	Nelson's Flake—3.	Swinbourne's Patent.
Three and a-half grains of chrome alum to two drachms of dry gelatine.	Three grains of chrome alum to two drachms of dry gelatine.	Three grains of chrome alum to two drachms of dry gelatine.	Three grains of chrome alum to two drachms of dry gelatine.	Four grains of chrome alum to two drachms of dry gelatine.

When mixed with bichromate of potassium they seemed all to take a little more chrome alum—particularly Swinbourne's patent gelatine.

I hear that one of the capitals of Australia is shortly to be honoured with a visit from a French gentleman—an operator in photo-mechanical printing—to see if there be room for him to start in that line. I fear he will find the country a little too young yet, as there are really not a sufficient number of manufacturers to supply work in that branch, while the Government is already provided with one in the person of your correspondent.

I find to my delight, and I hope also to that of all disinterested photographers, that the carbon process is likely to be pretty well worked in this country. One house showed me some prints taken a few days ago. They were portraits, and very fine impressions. The tissue was prepared in a bath containing only one-half per cent. of bichromate of potash, and sensitised in a room with the thermometer standing at about 89° to 90°. This ought to give encouragement to carbon workers.

While on the subject of carbon let me remind such of my *confrères* who are troubled with reticulation of the very simple method of collodionising a glass plate (previously waxed or rubbed over with talc powder) with normal collodion. Let it dry, and when the paper is taken out of the bichromate bath lay it on the plate, and rub down gently with a squeegee. In making some transparencies a few days back I was troubled with it, but on using the collodion it entirely disappeared.

I am afraid I shall get into trouble here with our friends the artists. I often think how monstrous it is for a class of persons, working with colours and brush, trying to imitate nature with more or less success, and calling that "art." What art? The art of mixing colours and imagining all sorts of unnatural combinations, leaving out the very essence of nature, and then standing upon a pedestal, exclaiming—"Ours only is art!" Let us take a leaf. The photographer by his tools—camera, lens, chemicals, light, &c.—represents every dot or form that Nature has given it, but does not by itself give colour. The artist or colourist, by a few dabs of his brush, produces something resembling in colour the leaf, but wofully deficient in those parts that make the leaf what it is—Nature's own work, and which photography only can do. These two agents are therefore imperfect; one has not colour, and the other lacks detail. How, then, can the one tell the other he is deficient? I think the days are gone by when the colourist can call his own imaginings "art," and those of photography "artless." Seeing that good photography and skilled men—men who have art in them, but after Nature's will and not after man's old-fashioned notions—now find admirers for their works when the *soi-disant* artist (who only condescends to permit the existence of photography to suit his own purpose of copying or getting tit-bits) is gradually becoming alive to the fact that "Othello's occupation" is *going*. L. H.

Sydney, March 16, 1878.

OXYGEN RETORTS.

To the Editors.

Gentlemen,—Once more in self-defence I crave your indulgence.

In your last issue Mr. Young charges me with copying his "patent retort," which he states he exhibited to a few members and friends at the Manchester Photographic Society's meeting on February 14, 1878. He should also have mentioned that the exhibition was made privately, as he was informed officially that he must not exhibit the apparatus before the company.

On this same evening I myself was fully occupied, having a paper to read, some experiments to perform, and a lantern exhibition to conduct, and was therefore not able to give attention to Mr. Young's private exhibition. Up to now I have never seen the apparatus in question, nor have I since (to my knowledge) had conversation with any one who did see it. That Mr. Young can now claim a safety-valve arrangement to an oxygen retort seems to overtop his previous claims, for in this Journal, June 15, 1877, page 287, *he denounced the principle as worthless!* I am, however, glad to see he has had the good sense to adopt the principle (which is mine), and which was first published by me.

Mr. Young is in error when he states that his apparatus is worth copying. No one needs to copy his, knowing full well (as nearly every lantern man in Manchester does) that the so-called Young's retort is directly obtained from Mr. Noton's, both in principle and shape; and that the gas-holder is a feeble copy of that of Mr. Samuel Highley.

It was as an amateur that I published my retort, and only through the cantankerous spirit of Mr. Young, and frequent solicitations from others, was I driven into the manufacture of the same. I am now making dozens, and shall continue to do so in spite of any empty threats emanating from Mr. Young.

In conclusion: I beg to say I object to using your "Correspondence" column as a medium for advertising; and, moreover, a controversy has already taken place in which Mr. Young not only lamentably displayed his weakness, but was left fully aware of the invalidity of his so-called invention. As a renewal of the same would, I am sure, be monotonous to your readers, I must decline to hold further argument in the matter (at the same time remaining quite satisfied that I have maintained my own *unpatented* invention), and must treat further correspondence from the same source on this subject with silence.—I am, yours, &c., W. J. Chadwick.

Prince's Bridge, Manchester, June 3, 1878.

APPLICATIONS FOR NEW PATENTS.

January 14, 1878.—"Production and Preservation of Coloured Photographs. No. 176."—Gertrude Dale.

February 2, 1878.—"An Improvement in Illuminating Objects to be Photographed and the Interior of Public and other Buildings. No. 446."—H. V. Weyde.

February 5, 1878.—"Preparing for, and for Imparting to, Photographs and other Illustrations of all kinds the Tones and Tints of Natural Colours, for Rendering these Representations more Real and Lifelike, and for Improvements in Mounting them and Coupling them together, and in Enclosing them in or between Glass, Metal, Leather, Wood, Vulcanite, and other Frames, or Cases, or Ornaments, Parts of all of which are Applicable to other Useful Purposes. No. 481."—H. R. Newton.

February 28, 1878.—"Folding or Portable Tents. No. 818."—L. Field.

March 6, 1878.—"A New or Improved Chemical Process for Converting or Transforming Paper Photographs into Oil Paintings upon Canvas, Wood, Metal, or other Materials. No. 906."—A. Prager.

March 19, 1878.—"New or Improved Pneumatic Arrangements for Facilitating the Uncapping, or Exposing and Capping, or Shutting the Lenses used in Apparatus for Depicting Persons or Objects by Photographic Means. No. 1097."—J. W. T. Cadett.

April 9, 1878.—"Producing and Correcting Negatives, without Photography, by the Aid of Paper Types. No. 1407."—C. Wayte and C. Herzog.

April 11, 1878.—"Means and Appliances for Producing Powerful Artificial Lights for Photographic and other Purposes. No. 1442."—G. E. Alder and J. A. Clark.

April 11, 1878.—"An Improved Photographic Camera. No. 1448."—S. W. Rouch.

April 12, 1878.—"Reproducing, by Photography, Designs for Lace, Net, or other Woven Fabric; and, at the same time, Producing Guide Lines by which the Openness or Closeness is determined. No. 1458."—N. Garthwaite.

April 15, 1878.—"Producing Stippled Tints, Backgrounds, and Vignettes upon Photographic Pictures. No. 1502."—M. Gutterburg.

April 24, 1878.—"Improvements in or in connection with Photographic and other Pictures. No. 1646."—H. Brassinne.

April 25, 1878.—"Improvements in or connected with Stereoscopic Slides and Frames. No. 1675."—E. J. Hebert.

May 17, 1878.—"Improved Photo-Chemical Process for the Production of Metallic Plates for Printing Purposes in General, for Jewellery, Signboards, and Plates. No. 1979."—A. Michaud.

May 18, 1878.—"Means or Apparatus Employed in the Manufacture of Carbon Tissue or Pigment Paper. No. 2007."—O. Sarony and J. R. Johnson.

May 30, 1878.—"An Improvement in the Production of Enlarged Photographs with Artistic Finish. No. 2174."—A. Harman.

Photographic Society of Great Britain.—At the next meeting of this Society, which will take place on Tuesday next, June 11, at 5, Pall Mall East, the following papers will be read:—*Alizarine: its Nature, Properties, and Applications to the Arts, and Particularly to Photography*, by J. R. Johnson; *The Alleged Fading of Carbon Prints*, by T. Bolas, F.C.S.; and *Photographic Notes from Travels in Russia, with Exhibition of Works, Materials, and Apparatus Presented and Collected in that Country*, by Leon Warnerke; also, an original method of preparing pigment and transfer papers will be shown by O. Sarony.

EXCHANGE COLUMN.

Wanted to exchange, a Tench's No. 2 baby lens (£20) for a good cabinet lens.—Address, Tear, 12, Clapham-road, S.W.

A first-class French lens, four inches in diameter, with mahogany camera for the same, is offered in exchange for anything useful.—Address, W. Slater, 166, Grange-road, London, S.E.

A universal accessory for the studio, eight changes (cost £8), will be exchanged for a rapid *carte* lens, six inches focus, or anything useful in photography.—Address, G. Bates, 12, Ryland-road, Birmingham.

ANSWERS TO CORRESPONDENTS.

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

W. Weston.—Received. In our next. A proof will be forwarded to our correspondent.

J. B. H.—The cause of the granularity must be sought for in the condition of the silver bath.

Tyro (Brixton).—By making the hyposulphite of soda bath much stronger you will in future be free from the stains which now destroy the prints.

B. P. S.—To prepare the insect for being photographed, place it in a solution of caustic potash according to the directions given in treatises on the mounting of microscopic objects. It must finally be mounted in balsam.

E. C. (Edinburgh).—The statement which you saw in a former number of this Journal is quite correct; it is *not* legal for any photographer to retain a still in his possession, even for the purpose of distilling water, without the permission of the Excise.

G. P. (Jersey).—We find in our own practice three inches a suitable distance at which to mount the lenses apart. This gives a sufficient degree of relief for the majority of subjects, and, when making use of plates seven or seven and a-half inches in length, leaves a small space at each end for marginal defects.

J. Brodie.—From the description of the lens we have no hesitation in pronouncing it to be one of the orthographic *genus*. It is probable that you will find it to be an excellent instrument, defining well with a large stop upon a field of limited dimensions. By making use of a small diaphragm—*e.g.*, $\frac{f}{30}$—it will cover a 12 × 10 plate well.

An Opal Enlarger.—We have no doubt that you have, as you state, made upon opal glass hundreds of pictures which have not faded; but before we know the value of this statement in connection with the "answer" to which it gave rise, we would require to know whether you adopt any of the processes we condemned. For example: do *you* tone with mercury?

Geo. Fox.—It is of little consequence whether the negative be intense or not, provided it possess a fair degree of relative density. Intensity is of the greatest importance in a negative that is intended to be printed from upon paper, but not so when it is to be used for printing upon a sensitive dry collodion plate; for upon the latter the intensity may be controlled to any desired extent by means of the developer.

G. P., Jun.—To ascertain the solvent powers of the various samples of cyanide of potassium in which you feel an interest, make solutions of each of a definite strength—say twenty grains to the ounce of water—and then saturate each with oxide of silver. Proceed in such a manner as that you may tell with accuracy the relative quantities dissolved by each solution, and in this way a fair idea of the solvent powers of each may be ascertained.

Forged Lenses.—Our attention has been drawn to the fact that on the continent some forged English lenses have recently made their appearance. One of these which we have seen is a whole-plate French lens of the most common type, having engraved on the mount in very large and imposing letters, "Dallmyers 3-B 3880 A.B. patent." Quite apart from the error in the spelling of the name, no one who has ever seen a lens manufactured by Mr. Dallmeyer could possibly be mistaken in supposing such instrument to be one of his productions. Still, it is possible that unwary people, especially on the continent, may be deceived. This points to the desirability of making purchases only from respectable or well-known persons.

W. Danks.—Having given a moderately-quick exposure to the plates sent by you, we found it an exceedingly difficult matter to get an image developed; but by dint of patience we eventually got images on both plates, these images being very beautiful and full of detail, but so feeble that a cursory observer would at first sight pronounce the plates to be free from any picture. The developer we employed was alkaline pyro. without any bromide in one case, a few grains of Epsom salts having been dissolved in the water in order to prevent the puckering of the film, which we expected to take place, but of which there was no indication. Your request will be forwarded to the gentleman named as soon as he returns from the continent, where we understand he is at present. There was no appearance of fogging on your plates.

W. L. R.—1. Make in one bottle a solution of four grains of pyrogallic acid and three grains of citric acid in two ounces of water, and in a second bottle a ten-grain solution of nitrate of silver. To intensify, after washing the plate, apply sufficient of the pyro. solution to cover the surface thoroughly, and then pour it off into a measure containing two or three drops of the silver solution, after which the whole is applied to the plate. The proportion of silver may be increased, but it is always desirable to use as little of it as possible.—2. The placing of blotting-paper behind a plate will not answer as a substitute for a proper backing to it unless the blotting-paper, which we assume to be of a red colour, has been made wet and is closely pasted to the glass. It is much better to employ a mixture of gum water, glycerine, and Spanish brown, the proportions of the glycerine being such as merely to prevent the gum from drying too hard. The most suitable proportions are attained when by the first application of a wet sponge to a dry backing it shall become sufficiently soft to be easily removed by washing with water, and such proportions may be found by making one or two trials when preparing a supply of backing material.

Geo. Reid.—Provided you can have the solar camera mounted in a very rigid manner upon the equatorial stand it will answer quite well; but we imagine that it will be found much more convenient in practice to adopt the system upon which Dr. Monckhoven constructs all his best cameras, viz., to have it placed in a horizontal, stationary position, and direct the solar light by means of a heliostat.

Erratum.—In Mr. J. Harmer's article, in our last number, on *Stereoscopic Transparency Printing*, at page 254, second column, eighth line from foot, for "plug" *read* "play."

Artistic Mounts.—Mr. Robert Banks, of Manchester, has submitted for our examination several specimens of a style of mount that is being manufactured by him, and the nature of which may be ascertained from our description of one or two of them. Imagine a photograph of a picture frame with very ornate surroundings, including curtains and other elaborations, the photograph being mounted on a card mount in the usual way, but the centre or vacant space in the picture frame cut out *a la passe-partout*, or "cut-out" mount, and a fair idea of Mr. Banks's system of mounts will be obtained. It will be obvious, of course, that a portrait may, by the simple act of placing it behind the aperture, be "framed" as well as mounted in a few minutes. Whatever opinion may be expressed as to the artistic value of mounts in which the ornate element is strongly pronounced, there can be no doubt as to the technical excellence of these productions of Mr. Banks.

"A Mistake Corrected."—Under this heading our excellent transatlantic contemporary, *Anthony's Photographic Bulletin*, points out an error into which we have inadvertently fallen in attributing to that journal a statement which was in reality made by a writer in another American contemporary. The editor of the *Bulletin* says:—"In The British Journal of Photography of the 5th of April, the Editor by an oversight has attributed to this journal an article which in reality was published in the *Philadelphia Photographer* over the initials 'W. B. C.' As this article is a hysterical denunciation of carbon printing, and a general condemnation of anything outside of the ordinary humdrum routine, it might very well appear in the Philadelphia journal '*without comment*.' We hope that the Editor of The British Journal of Photography will correct this error, and thus relieve the friends of carbon printing of the impression that we, who have been the firm friends of carbon printing and general improvement in this country, could thus go back on our own record and make no sign." Our explanation as to the occurrence of this mistake is simple, and will, we trust, be accepted as satisfactory by our brother of the *Bulletin*. To suit the exigencies of space, our printer was compelled to remove a small paragraph on a different subject which immediately preceded the one in question, and in which the *Philadelphia Photographer* was mentioned, and it was to this latter journal, and not to the *Bulletin*, we alluded when we made use of the words "in the same periodical"—an error the occurrence of which, we need scarcely say, we much regret.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician, *For the two Weeks ending June 5, 1878.*

These Observations are Taken at 8.30 a.m.

May.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
23	29·52	SW	49	51	63	47	Dull
24	29·32	W	51	56	63	51	Cloudy
25	29·64	NW	48	53	63	46	Cloudy
27	29·83	SW	51	56	64	48	Cloudy
28	29·80	SE	54	58	65	50	Dull
29	29·92	NE	51	52	—	50	Dull
30	30·14	E	47	51	57	48	Dull
31	30·04	E	50	55	67	45	Cloudy
June.							
1	30·00	E	52	55	60	51	Dull
3	29·97	E	54	55	70	52	Dull
4	29·79	SW	57	58	70	52	Dull
5	30·06	NE	50	53	59	50	Dull

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 945. Vol. XXV.—JUNE 14, 1878.

ALIZARINE IN PHOTOGRAPHY.

It is rather difficult to say what is or is not a subject of interest to bring before a photographic society; but we believe that many of our readers will be inclined to class *alizarine* as one of those topics not calculated to evoke much sympathetic feeling in their minds. Not that the subject is unimportant, for, on the contrary, as we shall show, it should be, and doubtless is, replete with interest, especially to the manufacturers of carbon tissue; but by the general public it will be classed as on a par with a disquisition on certain phases in the preparation of the glass used by opticians for constructing lenses. All are benefited by the production of good tissue and good lenses; but the technicalities of their respective manufacture are considered sufficiently safe in the hands of the manufacturers. Thus much in the interests of that large portion of the public who do not care in what manner the colouring matter of carbon tissue is prepared, so long as good tissue is supplied by those who make a speciality of its production.

It must be admitted that the paper read by Mr. J. R. Johnson at the meeting of the Photographic Society of Great Britain, on Tuesday evening last, was the means of imparting more information with respect to the nature and properties of alizarine than has ever before been presented to the public in an equally condensed form. Mr. Johnson, being an experienced chemist, can speak on such a subject as that in question in an authoritative manner; and, if in the discussion that followed, some exception was taken to certain of his remarks *apropos* of the general subject, the remainder of his observations were received in an unquestioning spirit.

Alizarine, we may here once more observe, is the colouring matter of madder, and its use in photography is to impart a warm tint to carbon tissue, which, without some such modifying pigment, would be of a more purely black tone than is desirable. In the early days of carbon printing carmine was added for this purpose. Experience, however, showed that the bloom communicated by this beautiful pigment was fugitive; hence the necessity for securing some more stable colouring matter that would bestow a similar bloom.

It is well known that the dyestuff known as "Turkey red" is one of the most stable of the cotton dyes; Mr. J. W. Swan naturally, therefore, sought to use this material in lieu of the unstable cochineal. The colouring principle of the dye is derived from the roots of madder, and, as Mr. Johnson has explained, it is known through the East under the designation of "alizarine." It is one of the triumphs of modern chemistry that the colouring principle of madder is capable of not only being separated from the root itself, but has also been extracted from that fertile source of brilliant colours—common coal; and this colouring principle, when thus isolated, receives the special name of "alizarine" whatever be the source from which it may be derived. Thus alizarine is imported into carbon printing to serve the useful purpose of imparting a warm tone, which mere carbon alone will not do.

But, recently, Dr. Monckhoven challenged the propriety of the use of this colouring agent, and he denied to it that property of permanence which Mr. Swan and others believed to be its characteristic. Mr. Johnson, as an early advocate for the use of alzarine, has taken up the cudgels in favour of this pigment, and offers his paper as a reply to the statements made by Dr. Monckhoven. The matter, therefore, stands at present as under discussion between two distinguished men, each of them more or less qualified to speak on the subject. Mr. Johnson very frankly accuses Dr. Monckhoven of both imperfectly understanding his subject and inefficiently introducing the pigment into tissue as a colouring agent; and he gives his reasons why Dr. Monckhoven has failed to secure the stability of this pigment, and also, by inference, why he (Mr. Johnson) has succeeded.

We can scarcely consider the matter as settled till we have heard the further rejoinder of Dr. Monckhoven. Meanwhile, however, our readers will now understand not only what alzarine is, and its importance, but also why the subject should be specially discussed, seeing that its efficiency has been so decidedly challenged. For full particulars we must refer the reader to Mr. Johnson's paper, which will appear in our next issue.

It may be thought that the matter might very well have rested between Mr. Johnson and Dr. Monckhoven, but, strangely enough, the discussion has resolved itself into a "triangular duel;" for Mr. Johnson, not content with exposing what he believed to be the fallacies of Dr. Monckhoven, considered it also his duty to twit the Autotype Company with both ignorance and neglect of this useful colouring agent. Upon this Mr. J. R. Sawyer rose, and in his turn, as representative of the Company, assailed both Dr. Monckhoven and Mr. Johnson, and thus it is "a very pretty quarrel as it stands," but one from which the public will be the gainers. It is a matter for sincere congratulation that those interested commercially in the preparation of carbon tissue should display so much assiduity in presenting productions possessing such a degree of excellence as to be beyond reproach.

OPERATORS AND APPARATUS.

It is, perhaps, a little unusual to link together the animate and the inanimate in this fashion; but, as in actual photographic life they hold together so much, they may be coupled in describing their virtues and their vices.

Possessing, as we do, opportunities of frequently visiting the *ateliers* of photographers of all grades and of all degrees of skill, we naturally come across operators of varied attainments and idiosyncracies; and we have found in the course of our experience that the habits of the operator may generally be predicated from an examination of his apparatus. As it may be quite as useful to point out occasionally what not to do as what to do, we shall this week give some idea of a recent experience we have had in manipulating ethics, so to speak.

We happened to form one of a number of friends who were being subjected to the painful operation of posing and photographing in a group. Our first entry into the studio gave us an idea of the operator. In various places were hung examples of his skill, which, there is no doubt, is considerable, though in the practical method of displaying it a large amount of waste, we are sure, must have been incurred. The cameras were all dirty, and covered with that peculiar hazy film which French-polished articles ignorant of the effects of an occasional polish are so liable to become coated with if they are not frequently rubbed with a cloth. The brasswork of the lenses was all rusted—if such a term may be used to brasswork—and the extra dark slides and every piece of apparatus not made use of in everyday routine were covered with dust and dirt, so that to handle them was to get our hands thoroughly well soiled at the outset.

Now, how easy to avoid these initial causes of annoyance! A dry cloth used to the lens mounting once a week would enable it to be preserved for years in its pristine brightness, and a slight cupboard would have been all that was necessary to keep the stray apparatus free from dust and dirt. A cupboard there was in the dark room and conveniently placed for the dark slide—evidence of the carefulness of a predecessor—but it was almost disused; and there were two or three slides lying against the bath-holder instead, ready for use and dusty. Of course, as there had been a lull, the system was carried out by there being no plate for cabinet size ready polished; for we saw that operation hastily performed while the models were waiting in the glass-house. Of course, also, a large assemblage of odd things were massed at the sitter's end of the studio, and required to be moved aside before our large party could be accommodated with space to expand during the posing. As the whole length of the studio was required there seemed to be a complete collection of *etceteras* which had to be pushed away to make room for the camera.

All these things, trivial in themselves separately, were collectively the cause of much loss of time; but, as it happened, the operator was gifted with an extraordinary amount of *sang froid*. He was by no means flurried or fussy in his manner, and we must confess he arranged the group otherwise expeditiously and skilfully. To his credit, we may further say, his dark slide was all right, in so far as it did not stick nor jar—a failing very common with gentlemen of this class. We, however, did not notice whether it was new or not.

With the freemasonry which connects all brethren of the craft, of whatever walk, we were soon *en rapport* with this unquestionably skilful manipulator, and were invited into the dark room during the development, which was performed without the slightest regard to the integrity of his hands—the plate being poised upon the tips of the fingers and thumb of the left hand, and the developer flowed over the plate and down on to the hands.

Our readers will be prepared to find from this description that the dark room arrangements were in keeping; and, indeed, so they were. The dark slide containing the exposed plate was placed, not on a shelf or a bench, but actually in the developing trough while the plate was being taken out, and then laid in its proper place on the table against a wall. Such a cynical disregard of the most ordinary precautions against stains we do not remember ever to have seen, the good negatives we saw in the same establishment having been made rather in spite of, than because of, the system. Naturally we did not see the failures; but it could not fail to be the case that they were not "few and far between," as in all properly-regulated laboratories ought to be the case. There should be "a place for everything, and everything in its place," and we assure those of our readers who are comparatively inexperienced that more than ordinary attention paid to this rule will enable them to conquer more than half their difficulties.

We may add further to this advice for the same class, by pointing out one particular direction in which care and cleanliness are of paramount importance, and that is in wet-plate work in tents. We have seen professional operators, as soon as their work was over, pack up camera, slide, and tent just in the state the last plate left them. The apparatus being used so often it would not have time to get thoroughly unworkable without a serious defect being noted and, perhaps, cured at once, and the chief ill result here would be their employer's pocket, as their apparatus would not last one-third the time it would under ordinary circumstances.

For the amateur, whose use for his apparatus is only occasional, the utmost care and attention will be needed, so that when he does unpack his instruments for a day's work he may find them at all usable. He must follow the practice of a professional worker who once delighted us by the way he packed up after a good hard day's work in photography. He first wiped out his two slides most carefully, running blotting-paper along all the grooves to take out any chance drop of moisture that might have been spilt in draining. He then wiped and polished them outside, wiped, dusted, and polished his camera all over, and then locked it up in its case. The tent received similar scrupulous attention. A sponge and towel freely used left it clean and dry as when new; and, when all was done with order, principle, and celerity, as it was, the time occupied seeming scarcely a minute or two more than the haphazard man would have taken, he turned round on our complimenting him and said—"It will be ready for use at a moment's notice, if I do not want it for twenty years." This, we think, is the principle which should guide every one in the use and care of his apparatus.

DEVELOPING POWER OF CUPROUS SALTS.

In a communication sent to The British Journal of Photography about this time last year I gave the results of some experiments made on development by salts of cuprous oxide. I have lately returned to this subject, using different salts from those employed last year, and now send the results, premising that the interest involved is purely a scientific one, as none of these developers equal in power the double oxalate of ferrous oxide and potash.

To obtain *cupro-ammonic oxalate* I first endeavoured to use a reaction mentioned in the Graham-Otto treatise. Sodium hyposulphite decolourises a solution of blue vitriol, and the resulting solution is well adapted, according to the treatise just named, for exhibiting all cuprous reactions. It is certain, however, that it will not give a precipitate of cuprous oxalate. It was invariably found that, when a precipitate was obtained from such a solution by oxalic acid or an alkaline oxalate the solution had not been completely reduced and a cupric salt was present, the precipitate was always cupric oxalate.

I then precipitated cupric oxalate from a solution of blue vitriol, dissolved the precipitate in neutral ammonia oxalate, and effected the reduction subsequently by the aid of zinc filings. Cupric oxalate dissolves readily in ammonium oxalate, affording a clear, light, greenish-blue solution. Zinc filings were left in contact with this solution (avoiding to add too much of the zinc) for about ten days. The result was a mixture of cuprous and cupric oxalate dissolved in the ammonia salt. This solution, considerably diluted, afforded a tolerably active developer, thus establishing the fact that cuprous oxalate has the power of bringing out the latent image.

I next prepared *ammoniacal cuprous oxalate* by dissolving cupric oxalate in liquid ammonia, and reducing by zinc filings. The oxalate dissolves readily and abundantly in strong liquid ammonia, producing an intensely dark-blue solution, which, by prolonged contact with zinc filings, gradually becomes paler, and at last almost entirely colourless. As in the former case, an excess of zinc filings must be avoided.

This solution exhibited considerable power as a developer. Its action, however, was difficult to manage. Employed in the proportion of ten or twelve drops to the ounce of water the image flashed out, and soon a general fogging followed. In the proportion of about two drops to the ounce scarcely any action followed. With three or four drops a tolerable development resulted, but not in any way comparable with that obtained with ferrous oxalate, and less regular than in the case of cupro-ammonic oxalate previously described.

Although these results do not give a promise of practical usefulness, they are, nevertheless, of considerable interest. They confirm the statement made last year that cuprous salts have undoubtedly the power of developing the latent image. Previously but a single metal had been known to possess that power; but it is now conclusively proved that copper salts, as well as those of iron, can exhibit the power of development.

Although cupric salts have not, like cuprous, the power of development, yet they stimulate the action of gallic acid and ammonia very considerably.

It has never, I think, been observed how nearly gallic acid used with liquid ammonia equals pyrogallic in the development of dry films, and the presence of a copper salt seems to stimulate the action. This may be shown in many ways. For example: if we make a pretty strong ammoniacal copper solution by adding liquid ammonia to a strong solution of blue vitriol until the blue precipitate redissolves completely, and then to this add a sixty-grain alcoholic solution of gallic acid, a copious bronze-green precipitate follows, rendering the liquid thick and pasty. If the gallic solution has not been added in excess the whole precipitate redissolves by adding an equal bulk of water; or if the copper solution has been a little more dilute the precipitate may not form. This solution added to water in the proportion of ten to twenty drops to the ounce gives a clean and vigorous development; or the ingredients may be separately added to water. We may take—

Water	2 ounces,
Cold saturated solution of blue vitriol	15 minims,
Strong ammonia	15 ,,
Sixty-grain alcoholic solution of gallic acid .	15 ,,

adding them in the above order.

This solution gives a very rich and beautiful development. A comparative trial was made between it and the ordinary pyrogallic and ammonia carbonate development. The cupro-gallic development gave a finer image, of an exceedingly rich, warm brown colour, but required a trifle longer exposure. I do not propose this development to take the place of the ferrous oxalate or of the pyrogallic, but it is interesting as showing how much more dry-plate development can be varied than has been hitherto supposed. A year ago no one believed that a good dry-plate development without pyrogallol was possible. The mode of treatment here described may interest those who are fond of experiment and like to vary their methods. There is probably no treatment that will give a better image and more richly shaded than this. Still, the ferrous oxalate developer deserves the preference, except where time of exposure is no object.

The following experience in development seems worth adding here—although it has no connection with copper salts—as showing how difficult it is to reason on the development of dry films:—It was found that when *ferrous acetate* was formed by dissolving iron in dilute acetic acid, and getting the acetic acid pretty well saturated, the resulting solution had considerable developing power. The action was slow, but regular and very clean, and by giving a long time to act a good image was got. Now, in forming ferrous acetate in this manner the acid is never quite saturated, because when it reaches a certain stage of dilution it ceases to act on the metal. Acid always checks development; and it, therefore, seemed probable that with a perfectly neutral solution of ferrous acetate a vigorous development would result. A perfectly neutral salt is easily obtained by mixing solutions of baric acetate and ferrous sulphate, and decanting from the baric sulphate formed. This neutral salt, however, exhibited scarcely any developing power. For a long time no result appeared; but, by making the solution four or five times as strong as in the preceding case, and letting it act for two hours, a weak image was obtained which nearly disappeared in a weak fixing solution; whereas in the other case a bright image had resulted which easily bore the action of the fixing bath. The whole result was the exact reverse of what analogy would have led one to expect.

Philadelphia, May 21, 1878. M. Carey Lea.

ON THE "CONTINUATING" ACTION OF CERTAIN RAYS, AND THE REDUCTION OF SILVER BROMIDE BY THE ALKALINE DEVELOPER.

I hope that Captain Abney will pardon me if I say that I do not fully appreciate his explanation of some of the phenomena touched upon in my last communication.

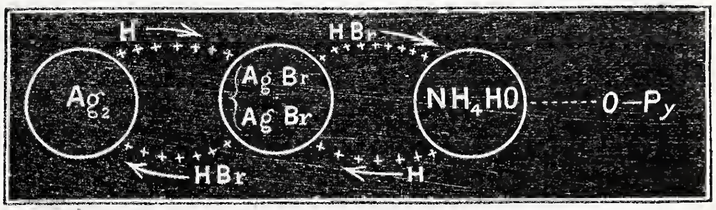
Now I understand that the effect of the rays, at one time called "continuating rays," on the invisible image was supposed to be in this wise:—A sensitive film could be exposed to the action of the actinic rays until a certain slight change was produced, whereby perhaps (say) a trace of an image might be obtained on development. Instead, however, of developing, the plate was exposed to the rays passing through a "non-actinic" glass for a considerable time and then developed, the result being that a much *more vigorous* image was obtained. I cannot reconcile this with Captain Abney's experience that "the continuating action which Becquerel and Claudet noticed . . . was really and truly an oxidising action." If the action be an oxidising action it would appear to be a *destroying* action, and this term would appear to me to be the more applicable one.

Before I go on to the next point I will explain my view of a former experiment of Captain Abney's—not for the sake of affording an explanation, because this has been already done by Captain Abney, but the better to make plain what follows.

A bromide plate might be exposed to light over its whole surface for a short time, and then cut into three pieces. The first might be developed with the alkaline developer, and, after allowing full time, the bromide might be found to be only reduced half way through the film. The second portion of the film might be transferred to a support impermeable to the developer, the surface which was previously in contact with the glass being now uppermost. On applying the developer the bromide would be found to be reduced *all through the film.* Again: the third portion might be taken and coated with emulsion. On development the upper coating would be found to be reduced all through, as well as the lower film as far as the light had acted, but no further. Before proceeding, let me ask—Have I stated the case correctly? I will suppose the answer to be in the affirmative. Then what I have to say is this—When we expose a plate, as in the first instance, and develope it in the ordinary way, it is found impossible to reduce the bromide through more than the upper half of the film; yet, if we reverse an exposed film identical in every respect, and then develope it, we obtain a total reduction of the bromide. Now, are not the particles of silver bromide in precisely the same relative mechanical position after the reversion of the film as they were before? And, if so, how are we to account for the marked difference in the behaviour of the films? From this it appears to me that Captain Abney's theory of the influence of the absence of "absolute contact" does not apply in this case.

I think that my readers will now understand my reasons for stating that the influence of the light-altered bromide is, at least mainly, in the *upward* direction, and not downwards or sideways. So far as I am aware no explanation has been given of this phenomenon. It appears to me that electro-decomposition may have something to do with it, and that the electric current passes from the ammonic hydrate (the positive pole) to the metallic silver (the negative pole). There is, evidently, a physical cause for the reduction of the silver bromide; for the same solution will not effect the same change chemically in the ordinary way. It must be also noticed that the particles of bromide are equally in contact, or out of contact, whichever way the case may really be. And if it be a fact that silver bromide cannot exist in absolute contact with metallic silver, as enunciated by Captain Abney, we seem forced to the conclusion that some insidious force passes through the particles of matter, disconnecting the particles of bromide, and effects the reduction of these latter.

I have an idea which I will explain by means of a diagram:—



The pyrogallic acid has a great affinity for oxygen, and takes it from the ammonic hydrate; at the same time the hydrogen of the semi-molecule of hydroxyl passing through the molecule of silver bromide, $\left\{\begin{matrix}Ag\ Br\\ Ag\ Br\end{matrix}\right.$, reduces it to the state of sub-bromide, Ag^2 Br, hydrobromic acid being formed. This combines with a molecule of metallic silver, whereby more sub-bromide is produced, and the hydrogen passes back to the former molecule of sub-bromide and entirely reduces it to metallic silver, while the other molecule is reduced by the developer. The hydrobromic acid, which is again formed, combines with the radical, ammonium, of the ammonic hydrate, producing ammonic bromide, the hydrogen liberated going through the same process again, except that instead of the hydrobromic acid combining at the end with the radical, ammonium, it combines with ammonia gas, producing ammonic bromide—$NH^3 + H\,Br = NH_4\,Br$; or with the ammonic hydrate, forming ammonic bromide and water—$NH_4\,HO + H\,Br = NH_4\,Br + OH_2$.

Whether this theory be in consonance with known facts I leave others to judge; it is, at least, an attempt to explain what Captain Abney has proved to be a fact. It may, at the same time, induce others to favour us with an explanation of the phenomenon.

Herbert B. Berkeley.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

The "composite" principle which has recently been applied to portraiture demands a word or two, as being the latest "fad" called into existence by our suggestive art-science. In order to acquire correct information as to the true Jones-Robinson type, a portrait of "component" Jones is thinly printed upon glass or paper, and a portrait of "component" Robinson, taken in the same position as the foregoing, is superimposed and printed upon that of Brown,

* Concluded from page 268.

their noses being the points of agreement in the print, which now becomes a "composite." Woe betide the printer if he be not careful to refrain from giving an undue degree of prominence to one or the other components, otherwise it will lead to confusion. Emma Jones and Maria Robinson will scan the composite production with a—"Lawks! Mariar, ain't it funny! its your par and my par too!" To which Maria indignantly replies:—"How *can* you be so silly, Emmar? You're quite welcome to the resemblance if you like it, for its a horrid fright, and ain't a bit like any member of *our* family!"

I have been so fortunate as to see several composite portraits, and have recognised more than two ears on some of them. But, granting the general soundness of the composite system, why confine it to portraits? I have some intention of visiting, camera in hand, scenes at a distance from home—an intention shared in by many at this time of year—and I desire to obtain correct types of the average residences of the natives of the country selected for my tour. With my mind imbued, as it is, with the composite idea, I am at this moment a little uncertain as to whether I shall make use of the chemical or the mechanical method of "compositography." By the former, I mean the taking of two different subjects—say a lord's mansion and a peasant's hut—upon one and the same sensitive plate; by the latter is to be understood the employment of two separate negatives of these subjects in the printing of one picture. The former, alas! is no novelty, as every one who has had the misfortune to inadvertently expose a plate twice only too well knows. But, then, in practising this system some regard for the decencies of pictorial art and possibilities must be shown; for it is scarcely in keeping with either of these to bring home from a tour—as did a friend of mine—a plate which, when developed, displayed a group of happy children disporting themselves at a cottage door in the middle of Dublin Bay! A "composite" arising from the lordly mansion and the crofter's hut, if properly done, would, I imagine, evolve a very decent suburban villa. So much for "composites" and "components."

The trigger was touched, and down fell the "instantaneous" exposing shutter with a thud that made both camera and camera-stand to vibrate most violently. "*That* plate is spoiled, anyhow," said my friend Innocent, who was standing by watching the operation with interest; "the camera is actually still in a state of tremor, and the image is sure to be blurred." "Now, my friend," I observed, "let me give you a brief lecture on exposing instantaneously and on the effect of agitating the camera. The spring (continued I) by which the shutter is propelled is a strong one, as you can observe; but by the touching of the trigger the aperture in the shutter flew past that of the lens. What I want to impress upon you is this—that it is neither the liberation of the spring-bound shutter, nor its motion, but its sudden cessation of motion, that causes the jarring by which the vibration of the camera is commenced. But as this only takes place *after* the exposure has been made it cannot possibly affect the sharpness of the image already impressed upon the plate."

In this, permit me to say, lies the philosophy of instantaneous exposures, or, to put it more accurately, of the construction and proper action of instantaneous shutters. Now, please, my reader, don't take me up before I fall: there is no such thing as instantaniety in exposure, or in anything in physics. Even a box on the ear is not "instantly" felt by the unfortunate recipient of such an application of physical discourtesy. A certain interval of time must elapse ere the sensory nerves can convey the intelligence to the brain. It is not a *very* long period, I grant; but for the purpose of the present argument it is a definite interval. Here is my definition of a theoretical instantaneous exposure—it is one the termination of which is coincident with its commencement. If I am correct this removes it from the region of mechanics. Photographically, the nearest approach to instantaniety I have known was when, at midnight, during a thunderstorm, I had a camera standing with lens uncapped ready to receive such an impression of external nature as the vivid lightning might yield. My senses told me that a carriage was being driven with great rapidity across what, if it were daylight, would have been the field of view of the camera, when suddenly came a blinding flash that made me start. It is known that in presence of grand natural phenomena one cannot always sink the sentient being in the philosopher, so I started and felt half-terrified. When I developed my plate the carriage appeared as if it had been motionless during the whole time of exposure.

But I am losing sight of what has originated these remarks. The pneumatic shutter of M. Cadett is bound to prove a success in the hands of those who know how to make use of it aright; but an unthinking operator may be apt to jar the camera to some slight extent if he employ it in obtaining quick exposures. By the pressure of the india-rubber ball the shutter flies up, and while moving upwards no jar can possibly take place; but when the shutter has attained its maximum elevation this act will be accompanied with a slight concussion, because a force exterior to the camera is acting upon it, and for which reason I conclude that for exposures demanding the most extreme rapidity the pneumatic shutter will not be applicable. But, so far as I have seen, this kind of work is not claimed to be performed by this shutter; and for such subjects as can be taken in one or more seconds it appears to be most admirably suited.

The general idea of the pneumatic shutter is excellent, but its ingenious inventor need not be surprised if before a month elapses he find a whole host of imitators and modifiers in the field. I know photographic history too well not to be aware that this is sure to be the case.

Apropos of this, here is an anecdote which is now published for the first time:—The late Voigtländer, when conversing with the genial and late William Callaghan, of Bond-street, *anent* the tendency of one optician to "improve" upon the works of another, remarked, with grim bitterness—"I believe that if the Creator of the Universe were to send to mankind a *perfect* photographic lens it would not be out three weeks before some London optician would be found to improve upon it." Mr. Callaghan told this to your "Peripatetic" correspondent with great gusto, for Callaghan was one of the most agreeable, jolly souls that ever lived, and one who dearly enjoyed a bit of banter; but, as was remarked at the time, Voigtländer had no occasion for indulging in this *innuendo*, for he had throughout his whole career abstained from bringing out any novelty in his own name. He professed to work according to the formulæ or principles of Petzval and Sommer; and, so far as I am aware, it is not impossible that the gift of improving upon pre-existing, or of devising new, forms of lenses may have been conferred upon others than the gentlemen here named—even upon London opticians. When the hypothetically "perfect" lens makes its appearance it will be time enough to speak with respect to the principle of "finality" in this direction. The popular idea of the coming (and *coming* it ever will be) lens is that it will have an aperture abnormally great, a focus abnormally deep, and the included angle of view abnormally wide. But we live in a wonderful age; we can now *see* a sound, hear the tramping of a flea's foot, and the gnashing of his jaws as he expresses disappointment at the result of some of his "little games;" and we can transmit these sounds—equally with those representing the *cavatina* of the latest *prima donna*—to the antipodes in the guise of an indented bit of tinfoil, there to be reproduced for the edification of the musical ear of the antipodean masses. Hence it is not safe to speculate upon optical possibilities, even though these may be held in check by mathematical limitations.

PRECIPITATED BROMIDE EMULSION.

[A communication to the Photographic Society of France.]

Having made during the past month my provision of dry plate emulsion for the current year, I submit to the Society several observations I have made, and which may possess a certain interest.

I have used, on this occasion, collodion prepared with a combination of bromide of cadmium, ammonium, and zinc, after the formulæ of M. Chardon. It has been kept one year to deposit, and was, in consequence, admirably limpid. Taking quantities of 400 c.c. of collodion prepared with the resistant cotton, and 200 c.c. of collodion made with the pulverulent cotton, I sensitised successively each of the 600 c.c. of mixed collodion with 18·30 grammes of pounded nitrate of silver, which is after the rate of 3·05 grammes per cent. I have thus obtained an emulsion containing a very small but constant excess of silver. After having neutralised this excess by the necessary addition of chloride of cobalt collodion, I precipitated the emulsion with hot water, which, when dry, gave me from twenty-nine to thirty grammes' weight of a precipitate. After redissolving the dried emulsion precipitate it gave me excellent results; but the character of the film was entirely different from that which I had obtained during my previous experiments with collodion prepared and aged only a few weeks.

In the first place the negatives, after development and fixing, presented, when dry, an uniform whitish and opaline tint, which at first sight might be considered the result of incomplete fixing; but such was not the case, however, and the varnish restored to the negative all its pristine transparency. Several months ago M. Davanne had announced this fact in an original article prepared for, and inserted at page 146 of, The British Journal Photographic Almanac, 1878.

In the second place—and this part of my observations has its importance—the fixed film was soluble in alcohol at 40°, and sometimes even in diluted alcohol. I have thus been obliged to abstain from washing the negative with alcohol before development; but I have had no cause to regret the film being so porous—in consequence, no doubt, of the age and ripeness of the collodion—which also causes a rapid development without having recourse to the previous washing with alcohol. For the same reason I have ceased to use alcoholic varnish; in consequence, the images obtained with this emulsion are of perfect purity, and it is scarcely possible to fog the images with alkaline development, even when pushed to the extreme limit of intensity.

I have equally tried, after analysing the excess of the silver in the collodion before precipitation, to neutralise it with iodised collodion instead of chlorised collodion. The reaction seems more slow, and, notwithstanding a considerable excess of alkaline iodide, I have still remarked the presence of a trace of free silver even forty-eight hours after the addition of the iodide. The film, when poured upon the glass plate, had a very good appearance, and on developing the image came out easily, even after a short exposure. Unfortunately the negative, without actually fogging, was very slow in attaining vigour, and I have not been able, even with the aid of pyrogallic acid, to obtain the degree of opacity necessary to yield a good printing negative.

In conclusion: I ought to state that, having tried the remainder at the bottom of a bottle of emulsion dissolved more than twelve months, to my great astonishment it gave a most excellent negative. I avow that I am not habitually so fortunate, and that generally my emulsions, after six weeks' dissolution, give me a film which splits very finely and cannot be utilised. I do not know the cause of this anomaly, but I draw this deduction, which has its value—that it is possible to keep indefinitety, in some manner, a dissolved emulsion. The question is—What are the conditions requisite to obtain this result?

Ch. Audra.

THE PHOTOGRAPHIC PRINTING PROCESS USED IN THE PORTUGUESE STATE PRINTING ESTABLISHMENT.*

Reproductions of Engravings.

Good typographic printing plates may be produced in the following way:—The sensitive mixture should be put on the zinc plates in as thin films as possible, and after being dried it is exposed in the printing-frame under a negative and rolled with ink as before. This process requires great care and skill so as not to allow the picture to be spoiled, as the acid is apt to attack the gelatine. It is, therefore, advisable to take the first copy upon a sheet of tinfoil, as in the process given for photolithography, and to transfer the fatty picture produced upon that to the zinc plate, and then to etch. This process is to be recommended for making plates of large dimensions.

Generally the process with asphalte is easier and more to be depended upon. The asphalte itself must be rather hard even at a considerable heat, and must still dissolve almost completely in benzine or in petroleum whose boiling-point lies between 80° and 100° C. The watery contents of the solvent are previously removed by enclosing it with calcic chloride. The following solution is then prepared:—

Benzine	100 grammes.
Oil of lavender	3 ,,
Asphalte	8 ,,

In order to find out the degree of sensitiveness of the preparation and its power of resisting oil of turpentine, which is used to develope the picture, coat a plate with the asphalte solution, let it dry, and lay upon it a figure cut out of black pasteboard; then expose from fifteen to twenty-five minutes to the action of the sun's rays. Now let the plate become cold, after which place it in a dipper and dip it into a vessel filled with cold turpentine. If after the lapse of a minute at most the figure shows sharp and clear, while the unlighted parts of the film are dissolved, then the solution is usable.

As the heat of the sun makes the asphalte sticky and might thus spoil the negative, it is well, before exposing, to rub both the negative and the asphalted zinc plate with a soft cloth and powdered talc. The negative ought also to be coated with a very hard varnish, that given under the heading No. I being very good. Before removing the plate from the negative, after the exposure, it must be allowed to become quite cold; the cooling is hastened by cleaning the back with a damp sponge.

* Concluded from page 269.

The admixture of oil of lavender hinders the solution from drying and makes the film equal in thickness. As soon as the solution is spread upon the plate lay the latter on the sheet-iron plate, mentioned at the beginning of (A) *Chromated Gelatine Processes*, which has previously been covered with a smooth sheet of paper. This sheet-iron plate should be turned until the film no longer smells of the oil of lavender.

When the picture has been developed in oil of turpentine it should be well washed with water from a tap furnished with a rose, in order to prevent the development from going too far. If it be found then that all the asphalte on the unexposed parts has not been dissolved, the plate should be dried between sheets of fine blotting-paper, and dipped again for a few seconds into the turpentine, and then rinsed at once with a good deal of water. The zinc plate is now drawn through very dilute nitric acid, slightly gummed, and rolled with ink.

The vessel in which the picture is developed should be polished at the bottom, so that the impurities of the bath may not injure it. It should be filled with cold turpentine, and the plate, when it has become cold, is placed in it. The development often occupies but a few seconds. The picture must not be left too long in the bath, and one should bear in mind the time which is lost between the drawing of the plate out of the bath and the washing.

Typographic Heliogravure with Half-Tones.

The production of *clichés* in half-tones for printing in the letterpress press is still an unsolved problem; still the experiment about to be described may lead to good results.

Some substance, such as sugar, starch, carbonate of lime, or carbonate of lead, which is soluble in water or in nitric acid, is rubbed into a solution of asphalte in oil of lavender. This is rubbed down upon a palette to an uniform, doughy mass, and as much benzine is added to it as produces a fluid of sufficient consistency. With this the zinc plate is coated, but not too thickly. When this coating is dry expose as usual, dip it in turpentine, and when the picture is taken out of that put it immediately into a bath of dilute nitric acid, as if to etch it. The acid penetrates the resinous film by dissolving the substance which gives it granularity, and perforates it in inverse proportion to the protecting action of the light, thus bringing out the half-tones. This etching process should not be continued too long. Parts that have been accidentally stripped bare are to be covered with varnish or lithographic chalk. The plate is then rolled with grounding ink and etched as usual.

José Julio Rodrigues.

AMMONIO-ARGENTIC IODIDE.

When silver iodide is exposed to ammonia gas it absorbs 3·6 per cent., and forms, according to Rammelsberg, a compound in which an atom of ammonia is united to two of AgI. Liquid ammonia instantly whitens AgI, and every trace of the strong lemon colour disappears. The behaviour of the ammonia iodide under the influence of light differs singularly from that of the plain iodide, and will be here described.

The affinity of AgI for ammonia is very slight. If the white compound be thrown upon a filter and washed with water the ammonia washes quickly out, the yellow colour reappearing. If simply exposed to the air the yellow colour returns while the powder is yet moist, so that the ammonia is held back with less energy than the water. So long, however, as the ammonia is present the properties of the iodide are entirely altered.

AgI precipitated with excess of KI does not darken by exposure to light even continued for months. But the same iodide exposed under liquid ammonia rapidly darkens to an intense violet-black, precisely similar to that of AgCl exposed to light, and not at all resembling the greenish-black of AgI exposed in presence of excess of silver nitrate. (This difference, no doubt, depends upon the yellow of the unchanged AgI mixing with the bluish-black of the changed, whereas in the case of the ammonia iodide the yellow colour has been first destroyed.)

When the exposure is continued for some time the intense violet-black colour gradually lightens again, and finally quite disappears; the iodide recovers its original yellow colour with perhaps a little more of a greyish shade. This is a new reaction, and differs entirely from anything that has been hitherto observed. It has been long known that darkened AgI, washed over with solution of KI and exposed to light, bleached. This last reaction is intelligible enough, for KI in solution exposed to light decomposes, and in presence of AgI darkened by light gives up iodine to the AgI, and so bleaches it. The above experiment is quite different. The darkened substance may be washed well with water (during which operation it passes from violet black to dark brown), and may then be exposed to light either under liquid ammonia or under pure water; in either case the bleaching takes place, though in the latter case more slowly.

If the experiment be performed in a test tube the bleaching under ammonia requires several hours; under water from one to three days. But if the iodide be formed upon paper, and this paper be exposed to light, washing it constantly with liquid ammonia, the darkening followed by the bleaching requires little more than a minute. In this case, however, the bleaching is not so complete, perhaps because of the influence of the organic matter present. The bleaching appears to depend upon the escape of ammonia; for if the darkened ammonia iodide is covered with strong liquid ammonia, and the test tube well corked, the bleaching does not take place.

It became a matter of interest to know whether the darkening under ammonia was accompanied by any decomposition—whether the ammonia took up iodine from the silver salt under the action of light. For this purpose AgI was precipitated with excess of KI, and subjected to a long and thorough washing; it was then exposed for several days to light under strong liquid ammonia. As AgI is not wholly insoluble in ammonia, the mother-water was first evaporated to dryness at a heat but little over ordinary temperatures. The traces of residue were washed with water, and this water gave distinct indications of iodine. The iodine present is in so small quantity that it may easily be overlooked, but it is certainly there. The washing given to the AgI was so thorough that it seemed impossible to admit that traces of KI remained attached to the AgI; but in order to leave no room for doubt the experiment was repeated, using an excess of silver nitrate in making the precipitation, followed by thorough washing. Iodine was still found in combination with ammonia, and under these conditions there could be no doubt that AgI had been decomposed.

When AgI is blackened under ammonia in a test tube, and the uncorked test tube is set aside in the dark for a day or two, the AgI assumes a singular pinkish shade. It thus appears that AgI under the influence of ammonia and of light gives indications of most of the colours of the spectrum. Starting with white it passes under the influence of light to violet, and thence nearly to black; this violet-black substance washed with water passes to brown. The brown substance covered with ammonia and left to itself in an open test tube becomes pinkish in the dark, yellow in sunlight. These curious relations to colour which we see in the silver haloids, from time to time exhibiting themselves in new ways, seem to give hope of the eventual discovery of some complete method of heliochromy.
—*Silliman's Journal.* M. Carey Lea.

TRANSATLANTIC NOTES.

There are few who visit the "States," at least for the first time, who do not manage to include in the tour a few hours at the far-famed Niagara, or "The Falls," as the Americans universally designate them; and as everyone tries to describe them, and many succeed much better than I could hope to do, I shall confine myself to matters more or less related to "Falls photography," which is considerably different from photography at any other place.

As on the occasion of a previous visit to Niagara I took up my abode on the American side I this time went over to the Canadian side, and soon found that although the Falls themselves are practically unchangeable it is very different with their surroundings. Then there was only one building for the accommodation of the sight-seing public on the latter side—the Clifton House (the word hotel does not seem to be in favour with Americans), a good half-mile below the Falls. Now from thence up to right opposite the Horse-shoe Fall is one continuous line of hotels, refreshment rooms, museums, curiosity stores, photographic establishments, &c., &c., &c., and the pedestrian is besieged at every step by touters, whose united confession of faith would seem to be that he is suffering from hunger and thirst; has no other object in life but the collection of Indian curiosities (which, by-the-bye, the Indians never saw); wants to be driven from place to place as rapidly as possible for the purpose of seeing them; that he is quite unable without their aid to secure a shelter for the night, and requires above all, and in addition to all, a supply of "Vanity Fair." The latter, however, is not the well-known production of Thackeray, but a special kind of tobacco, which would seem to be as well advertised as Holloway's pills, as during a run of over sixteen hundred miles there was hardly a rail fence on which the advice to "smoke Vanity Fair" was not painted, and that even in localities where but for the strip of clearing through which the train ran one might easily have supposed never to have been visited by man. But, deaf alike to all their entreaties, I took up my quarters in Prospect House, and as I don't know even the name of the proprietor, may, without being suspected of writing an interested puff, say that, situated about equidistant between the two Falls, its windows and piazza afford the most magnificent view of those grand natural wonders; and that for comfort, economy, and all that makes a hotel desirable, I have found none better either in the States or Canada. True, there is one little drawback which is somewhat troublesome at first, but one to which the visitor soon gets accustomed. The commotion in the atmosphere caused by the rapid motion of such an enormous mass of water produces in doors and windows an amount of vibration at first painfully visible to both eye and ear, and is apt, in the minds of the more timid, to raise doubts as to the stability of the structure. A careful examination, however, of the building shows that it is perfectly steady, and a glass brimful of water when placed on the doorstep gives no indication of motion, and by-and-bye even the most timid ones come to enjoy the not unmusical accompaniment during dinner or when enjoying the after-dinner cigar.

Early in the morning after our arrival I began my search for matter relating to photography; and, as the operators seem to believe in the early bird catching the worm, I had not far to go before I found one hard at work. Right in front of the Horse-shoe Fall, and close to the overhanging bank, a group of four were seated in a rude garden chair. They were dressed in oilskins, including hoods, that completely covered the figures, the face only being visible, and looked more like arctic explorers than tourists in a temperate clime; but having just visited below the Fall, they were easily persuaded to take the bait—"Have your photographs taken with the Fall as a background? Ye'r friends will be so amused to see you in the 'spray dresses.'" A few yards in front there was a pyramidal wooden erection, not unlike the cone used by the farmer in building his corn rick or stack. It appeared to be from ten to fifteen feet high, and had a camera firmly fixed on the top, but placed at such an angle that the centre of the plate took in the chair and its group of sitters. Such an arrangement was hardly suited for the most artistic work; but, as the operator subsequently remarked to me—"The Falls is the thing they most want. As they don't mostly come a second time we see the colour of their money before they go, and as we send the pictures a long way after them we rarely hear how they please." In a few minutes he came out, dark slide in hand, and climbing up the framework, without taking the trouble to adjust or focus, gave an exposure of a few seconds, and invited me to see the plate developed. I did not expect much, and therefore was not disappointed; but came to the conclusion that it was good for the proprietor that "payment in advance" was a *sine quâ non*, and that the sitters "did'nt mostly come again." On the whole, however, good work could hardly be expected under such adverse circumstances. The spray from the Falls, unless on very exceptional days, envelopes the place in something quite as aqueous as a "Scotch mist," which soaks both operator and apparatus, and brings about, always in the latter and sometimes also in the former, a state of dilapidation that makes success difficult. The proprietor, whom I subsequently met, and who "*runs*" the "Falls House"—a liquor bar, a curiosity store, and a *camera obscura* in addition to the photographic establishment—assured me that the latter paid very well when he succeeded in getting and keeping a touter who understood human nature well enough to discover the weak points of the visitors, and play on them till he had them in the sitting chair.

A little further down, and immediately opposite the American Fall, I saw another camera ready for action, but this time mounted on an ordinary tripod; and as the spray rarely reaches this part it was in more respectable and better working condition. As I passed along, a fine specimen of the orthodox nasal-twanged Yankee crossed over, and presenting a really excellent 7 × 5 print, assured me that I could not do better than let him take me; that the day was peculiarly favourable and he had a plate ready, and wonld not keep me more than a few seconds. Rarely, indeed, could the Fall be so well included in the photograph, and more rarely still were such fine clouds to be obtained, while my attention was directed to the specimen in his hand as a proof of what could be got if I would only sit at once, as the effects were fleeting, and a composition so perfect might not again occur for months. But the charmer charmed in vain. The fact was that the beautiful specimen had been printed, and beautifully printed, from three negatives—figures, Falls, and clouds—and of course I told him so, adding that although I did not want to be photographed I did want information on matters photographic, and thought he was just the kind of man to give it. This was followed by a cordial invitation to examine his place and work, and an offer to tell me everything he knew, or to give me any information I wanted. The inspection was in every way satisfactory, the majority of the specimens being of a high class, although there was just a tendency to make the clouds a little too pronounced, but that, he assured me, was really necessary to meet the tastes of his patrons. During our chat he kept "whitling" at sticks, but not in the aimless way said to be characteristic of the Yankees. They were of beech, hazel, and hickory, and he was rounding them and putting on ferrules preparatory to varnishing and selling them for fifty cents each.

His name—Mr. Davis—is not unknown in American photographic circles, as he it was who took, under difficulties that would have frightened less courageous operators, most of the magnificent negatives from which the famous pictures of the Yo Semite Valley are printed. I believe he was commissioned to produce one hundred 24 × 18 negatives, and received for his ardous task eighteen hundred dollars, or about twenty pounds each—a rather poor recompense, seeing that some six months were occupied in their production. During that time, however, he also made many hundred stereo. and other sizes, some of which were sold for good prices, and the rest remain in his hands "a dripping roast" still.

While thus engaged, two fresh arrivals made their appearance, and Mr. Davis at once pounced upon them, repeating again the arguments with which he plied me, but with a better result, as in a few minutes he had secured a good negative of a group of two, got an order for half-a-dozen copies each, to be forwarded to Galashiels and Selkirk respectively, and pocketed twelve dollars (fifty shillings) for the work—not such a good price as at first sight it may seem, as each print had to be produced from three separate negatives.

Mr. Davis is also strong in winter work at the Falls, and shows some very fine prints from 24 × 18 negatives. Those negatives, however, he sells, as he does not seem to care for the publishing part of the business. He speaks enthusiastically of the winter work, and evidently delights in overcoming the difficulties incident to a temperature often far below zero, when the so-much-admired frozen spray effects are best obtained. For this purpose a descent to the bed of the river, considerably over one hundred and seventy feet, is necessary, and there he erects a tent, or rather wooden house, in which he keeps himself and his solutions far above the freezing point by a large American stove liberally supplied with blazing logs.

Like nearly all American photographers he manufactures his own collodion and is fond of experimenting; but, unlike most of them, he communicates the results very freely—at least to those who are not above being taught—and he boasts of being able to work with an exposure of at least one-sixth of what is generally required. This he has frequently demonstrated, and his assertions have been confirmed by several persons that I have since seen. I made a note of the formula for both collodion and developer, and shall publish it in my next letter, my note-book being at present sixteen hundred miles from where I write, but is rapidly following me.

Crossing over to the American side I visited the establishment of Mr. Curtis—a name almost universally known in connection with the publication of stereoscopic slides of the Falls. It is situated in a quiet side street in Niagara Village, and, so far as external appearance is concerned, shows nothing of the extensive trade that is carried on within. Unfortunately for me Mr. Curtis was from home, but his polite assistants showed me over the whole place. In Europe the decline, or almost extinction, of the demand for stereoscopic pictures has long been a source of complaint; but they are still very popular in America, and in this establishment alone many thousands are produced every week, of the Falls and their surroundings. The skeleton stereoscope—introduced, I think, by Mr. Wendell Holmes, and almost universally used in the United States—admits of the use of larger pictures than those usually found in the old country; and here I saw in process of production immense quantities measuring 7 × 5 inches, or perhaps a little longer. Great, however, as is the stereoscopic trade at present, it is not nearly up to that of former years. With a view to keep his assistants employed Mr. Curtis has recently commenced to produce enlarged transparencies from the stereo. negatives, and they are becoming very popular. The sizes are from 10 × 8 up to 20 × 14, backed with glass obscured by an opaque emulsion, and have a broad margin. This margin has lines or designs made by removing portions of the opaque backing, and the whole is bound with dark paper in the usual manner. The smaller sizes sell for about ten shillings, and form beautifully-attractive window ornaments. More recently still he has introduced the same articles coloured in oils, which are really charming, and, I think, must be a success. At present they are made on wet collodion plates; but, from what I have since seen in New York, I know that carbon transfers will be in many respects better and more easily managed, and would advise all who wish to try their hands at this work to adopt that method.

I had also the pleasure of examining a large number of Mr. Curtis's negatives, and have no doubt that much of the beauty of the transparencies is due to their extreme delicacy. They are very thin, full of charming detail, and perfectly free from spot or blemish of any kind. Somebody advertises for sale "the collodion used by Mr. Curtis at the Falls." If the clearness and beauty of his negatives are due in any way to the materials he employs his formulæ are very much to be desired; but I strongly suspect that in this, as in most other cases, the excellence belongs more to the man than to the material.

Much more might be said of photography at the Falls, but this letter is already long enough. I must, therefore, reluctantly bring it to a close, and in my next shall cross Niagara again, and note what is doing in Canada and the West, and especially how some exquisitely-beautiful snow scenes, including the various winter amusements of the Canadians, are produced. John Nicol, Ph.D.

PARIS EXHIBITION.

The following is the list of jurors appointed in connection with photography, photographic apparatus, and photographic instruments and appliances, so far as gazetted, to the present time:—

Group 2.

Jules Simon, *President* (France).
1st *Vice-President* (United States).
M. Delisle, 2nd ,, (France).

Jury, Class 12.—M. A. Davanne, Comte Réné d'Heliand, M. A. Martin (France).

Jury, Class 15.—MM. Cornu, Laussedat, Mouchez, Perrier (France); Lord Lindsay (England).

Class 12.—Photographs and Apparatus.

England and Colonies.—(Not gazetted yet).

United States.—(Not gazetted yet).

Austria-Hungary.—Herr Frederic Luckhardt, photographer to the Imperial and Royal Court at Vienna; Herr Louis Lechner, *commissaire-adjoint* of Hungary, Councillor of the Direction of the Society of Engineers and Architects, representative of Buda-Pesth.

Russia.—M. Levitzski, photographer to the Court.

Holland.—M. J. J. van Kerkwyk, member of the Second Chamber of the General States of Holland.

France.—MM. A. Davanne, President of the Society of Photography, Juror in 1867 at Paris, Vice-President of the Jury at Vienna in 1873, President of the Committee of Admission at Paris, 1878; Heliand (Réné Comte d'), Secretary of the Committee of Admission and Installation, Paris, 1878; Martin Adolphe, Professor of Physics, member of the Committee of Admission at Paris, 1878.——*Supplementary Juror:* M. Franck de Villecholles, photographer, Professor at the Ecole Centrale, member of the Committee of Admission at the Exhibition Universal, 1878.

Class 15.—Instruments of Precision.

England and Colonies.—Lord Lindsay, M.P.

Sweden and Norway.—Dr. O. J. Broch, Professor of Mathematics at the University of Christiania.

Italy.—Professor Guiseppe Colombo.

Austria-Hungary.—Dr. Ernest de Fleischl, Privy Professor-*adjoint* of the University of Vienna.

Switzerland.—M. Louis Soret, Professor à Geneva.

France.—M. Cornu, Professor of Physics at the Faculty of Sciences and at the Ecole Polytechnique, Member of the Jury in 1867, Member of the Committee of Admission, Exposition Universelle, 1878; M. Laussedat, Colonel of Engineers, Professor at the Conservatoire of Arts and Métiers, Member of the Committees of Admission and Installation, 1878; Commandant Mouchez, Member of the Institut of France; Commandant Perrier, Member du Bureau de Longitudes, Member of the Jury of the Exhibition of Philadelphia, Member of the Committees of Admission and Installation, 1878.——*Supplementary Jury:* M. Bardoux père, Ancient Judge of the Tribunal of Commerce, manufacturer of optical instruments. W. Harrison.

FOREIGN NOTES AND NEWS.

Volhardt's Method for the Volumetric Analysis of Silver Baths.—Herr Strumper's Patent.—Discontinuation of the *Lichtbildkunst.*—Dr. J. M. Eder on the Solubility of Silver Salts in Alcohol.

At a recent meeting of the Berlin Photographic Association Dr. Vogel gave the following account of Volhardt's method for the volumetric analysis of silver, which is adapted to the determination of the silver contents of photographic baths, and which only differs from Vogel's test by using sulphocyanide of ammonium instead of iodide of potassium as the testing solution. The usual burette and pipette are used:—

"Dissolve six grammes of sulphocyanide of ammonium in 1,000 grammes of water; fill the *burette*, and determine the solution first of all.

"For this purpose take a silver solution containing exactly ten grammes of the silver salt in 100 cubic centimetres, and to one cubic centimetre of this solution add one cubic centimetre of a solution of five parts of ferric sulphate in a hundred parts water.

"This is coloured of a deep red by sulphocyanide of ammonium, but in the presence of a salt of silver the colour disappears, owing to the formation of sulphocyanide of silver.

"Add the sulphocyanide solution drop by drop until the red colour so produced remains even when the vessel is shaken. Supposing that to produce this effect has required 7·8 cubic centimetres, that would prove the presence of exactly one-tenth of a gramme of silver, or, in other words, of ten per cent. Then take 780 c.c. and dilute it to 1,000 c c. and you will then have a solution which, when added to a cubic centimetre of the silver solution, proves the presence of one per cent. of the silver salt for every cubic centimetre of itself that is required.

"The determination of the sulphocyanide testing solution is not easy for photographers who are not also chemists, and it would be more convenient if manufacturers would prepare it for the market of the proper strength.

"The sulphocyanide test has the advantage of only requiring one fluid—the ferric sulphate—as an *indicator* (to show when the precipitation ends), while by Vogel's silver test two fluids are required—a fresh solution of starch and nitrous acid. Still, the blue colour produced by Vogel's test (being complementary to the yellow of the iodide of silver) is more easily distinguished than is the yellow of the sulphocyanide of iron."

Herr J. H. Strumper, of Hamburg, has just patented a process for burning-in lichtdrucks upon glass and porcelain.

From the *Monatsblätter* we learn that MM. Braun and Co., of Dornach, intend to discontinue the publication of the *Lichtbildkunst.*

The *Mittheilungen*, quoting from an article on the solubility of silver salts, which appeared in a chemical journal, says that, according to Dr. J. M. Eder—

"100 parts of a spirit of wine solution

Of............	95	80	70	60	50	40	30	20	10	Volumetric per cent.
Will dissolve at 15° C	3·8	10·3	22·1	30·5	35·8	56·4	73·7	107	158	Parts by weight of nitrate of silver.
,, ,, 50° C	7·3	—	—	58·1	—	98·3	—	214	—	
,, ,, 75° C	18·3	42·0	—	89·0	—	160·0	—	340	—	

In pure ether, as well as when it is saturated with water, only traces of the nitrate of silver are soluble. The addition of a little alcohol to the ether increases the solubility of the nitrate of silver considerably. 1. A hundred parts by weight of a mixture of one part by bulk of 95 vol. per cent. alcohol with one part by bulk of pure ether will dissolve at 15° C 1·6 part by weight of nitrate of silver. 2. A hundred parts by weight of a mixture of two parts by bulk of the same alcohol, and one part by bulk of ether, will dissolve 2·3 parts by weight of nitrate of silver. 3. A hundred parts by weight of water saturated with ether was able at 15° C to dissolve 88·4 (? 4·88) parts of nitrate of silver.

"A second series of experiments determined how many grammes of nitrate of silver were contained in every 100 c.c. of the various solutions when saturated, with the following results:—

In 100 c.c. of solution of spirit of wine

Of............	95	80	70	60	50	40	30	20	10	Volumetric per cent.
Contained at 15° C..	3·0	8·6	21·0	27·1	33·4	52·8	60·6	89·1	130	Grammes nitrate of silver.
,, ,, 75° C..	12·5	33·6	—	51·0	—	108	—	—	—	

At 15° C. a hundred c.c. of a mixture of equal bulks of (95 per cent.) alcohol and ether contained in solution 1·4 grammes nitrate of silver."

These figures are valuable in working out the emulsion process or Obernetter's process, though, of course (as the editor of the *Mittheilungen* remarks), the properties of the collodion cotton will exercise a certain influence on the solubility of the silver salt in collodion. The experience of the latter gentleman is that an ordinary cotton for wet plates, treated according to Obernetter's formula, furnishes a perfectly clear silver collodion, while an English dry-plate cotton gives a collodion from which the silver salt is thrown off in the form of crystals. The result of Dr. Eder's paper treats on the solubility of sulphate of silver.

PHOTOGRAPHY IN COURT.

THE COPYRIGHT ACT.

On Monday last, the 10th instant, Henry Reastern, a hawker, of Osborne-street, Whitechapel, was summoned before Mr. Bushby at the Worship-street Police Court by Mr. Benjamin Brooks, fine art publisher, of the Strand, for selling pirated copies of copyright pictures. Mr. Silberberg, solicitor, defended. The evidence of prosecutor and of a witness named Burgess, a private inquiry agent, showed that the defendant was seen going from publichouse to publichouse and selling there and in the streets photographs of pictures known as the *Soldier Boy's Dream*, the *Light of the World*, and *Cattle of Brittany*. The witness Burgess first accosted the defendant, and cautioned him that he would get into trouble if he continued to sell the photographs, as the pictures were copyright. Mr. Brooks some two or three minutes afterwards went to the defendant and purchased as a stranger a copy of each, and then got a constable to obtain the defendant's name and address. Mr. Brooks produced the assignments from the painters of the pictures, Holman Hunt and others, to publish and print the same, and said that two of them had cost him 100 guineas each, besides all the expense of engraving and printing. They were properly registered and published. An objection taken by Mr. Silberberg that the assignments required stamps was overruled. Mr. Bushby, however, considered that he could not convict the defendant, for the Act required knowledge on the part of the seller, and there was no proof that he knew the works were copyright. Mr. Silberberg made the usual defence that his client had only been a few months in London and did not know the language or the pictures which were sold him by the photographer. Mr. Brooks said he had instituted proceedings against a "manufacturer," but it was difficult to catch them or get evidence against them. Last week he discovered in the cloak-room of a railway station a large parcel of the photographs, the "manufacturer" who employed the hawkers keeping them there so that the hawkers might meet him when necessary and he supply them. Mr. Bushby dismissed the summons, but said he sympathised with Mr. Brooks.

On Tuesday last, at the Lambeth Police Court, Albert John Sanders, of 2, Albert-terrace, Church-road, Upper Norwood, appeared to five summonses taken out by Mr. Benjamin Brooks, fine art publisher, of 171, Strand, for having without his consent sold photographs of engravings of which he had the copyright. Mr. Dutton appeared for the defendant. Mr. Brooks stated that he had spent thousands of pounds in the purchase of works of art, and it certainly was hard to find persons making photographs of many such works and selling them for a few pence. Such a system was extensively carried on. Evidence was then called proving the purchase at the defendant's shop of photographic copies of engravings entitled *Patience and Tribulation*, *The Emigrants' Farewell*, *Obedient to the Laws*, *Saved from the Wreck*, and *Brittany Cattle*, all being the copyright of the complainant. Mr. Dutton, after some discussion as to the law on the matter, said his client would plead "guilty," although he did not know he was doing wrong at the time. He wished also to state that the defendant was in great pecuniary difficulties and unable to meet his creditors. Mr. Chance required the defendant to pay a fine of 20s. on each of the five summonses.

THE ENGLISH PHOTOGRAPHS AT THE PARIS EXHIBITION.

The correspondent of the *Daily Telegraph*, under date of the 9th inst., has made the following observations on this department of the International Exhibition :—

In the synopsis of classification followed by the Exhibition catalogue a group which demands particular note is that defined under the heads "Education and Instruction : Apparatus and Processes of the Liberal Arts." Classes from 6 to 16 are herein comprised, and it would be manifestly impossible to deal with them analytically, or even in a cursory manner, within the compass of an article. All kinds of stationery and bookbinding, of painting and drawing materials, of printing and books, of mathematical and philosophical instruments, and of photography with its adjuncts and appliances, are to be found in that part of the British section which is nearest the pavilion built from the plans of Mr. Gilbert Redgrave, the architect to the Royal Commission, for the Prince of Wales. It may suffice if I now indicate the most important exhibits here attracting the eye of the visitor, and fulfil my intention of bringing prominently into notice such objects as illustrate an advance in old paths or a promising entry upon new ones.

A great encouragement to such an attempt is the manifest excellence of these classes, furnished as they are by English exhibitors, or at all events by those who pursue their skilled vocation in England. Photography has made marvellous progress in all countries, from the time of its first discovery down to the present day; nor have the strides of improvement and invention in this art been fewer or less noteworthy within the past few years than in any period of its interesting history. The specimens of brilliant and artistic work, secured from fading by the carbon process, are in the highest degree creditable to such accomplished photographers as Signor Lombardi, of Brighton and Pall-mall. This skilful artist, as usual, affords a conspicuously striking and meritorious show of large portraits, which are arranged in a handsome case of silk velvet, the colour of the ground being maize, and the other portions ruby and gold. The design of this framework is due to Messrs. Messrs. Dupuis and Co., whose fine-art gallery in West-street, Brighton, adjoins the studio of Signor Lombardi; and, as a piece of workmanship, the case in question is worthy the magnificent examples of photographic art which it contains. An enlarged portrait, on permanent tissue, of Mrs. Bligh, is the first work in this collection to call for notice; it measures about 50 inches by 40, and in its splendid carved frame of Florentine character makes a very imposing show of itself, being in fact of a size which, were the subject not so gracefully feminine, might be termed Herculean. Another likeness to which the most careless vision could not but be attracted is that of a lady who, no very long time since, made a considerable stir in the ears of society. The details of this strikingly-truthful portrait of Mrs. Bravo are remarkable for wonderful texture and finish, and the entire work is a crowning success of heliography. Without enumerating the whole of Signor Lombardi's collection, I must find space to mention a triad of heads which he aptly calls "The Three English Graces," being character-portraits of Lady Wentworth, as Mary Queen of Scots; Mrs. Turner, as a Hungarian Vivandière; and Mrs. Bligh, as Marguerite.

Portraits from life by M. Boucher, also of Brighton, indicate the exercise of great care and taste, guided by the skill which is only acquired through long practice and diligent application. The heads are characterised by a reality of light and shadow, answering to the effect of roundness and fine modelling, and the resemblances are all impressively lifelike and agreeable. The London Stereoscopic Company makes a specialty of portraiture, comprising a gallery of distinguished persons in France. Mr. Robert Slingsby, of Lincoln, shows some good photographic portraits of large size, taken direct from life, together with a few nature studies combining portraiture and landscape, with excellent effect. An exhibition *per se* is Mr. Vanderweyde's collection of likenesses taken by the electric light. Their effect is legitimately pictorial, while retaining the quality of truthfulness to an almost realistic but still pleasing extent. Obviously, a great advantage of the process is the fact that it overrides the influences of fluctuating daylight, and accommodates the convenience of ladies who may desire to be portrayed in ball or drawing-room dress. Messrs. Elliott and Fry have a large exhibition of photographic portraits, exemplifying their well-known delicacy of execution. In landscape, and especially the natural variations of foliage, ground vegetation, and cloud-shadow, Mr. Vernon Heath shows his mastery of subject and means. Examples are displayed by him of the enlarged autotype prints by which he has represented a series of more than 200 well-known places, country mansions, and celebrated trees in the British Isles.

Landscape photographs, in a well-known style, are also contributed by Mr. Bedford; and the representation of natural scenes is effectively carried out by Mr. T. M. Brownrigg, with the wet collodion process. Combination pictures are exhibited by Mr. H. P. Robinson and Mr. Samuel Fry; and there are some excellent studies of animals, by Mr. Alfred Fisk, Mr. David Hedges, and Mr. Frederick York, the last-named photographer exhibiting transparencies of carnivora and other objects of brute life, from the Zoological Gardens, arranged for use with the magic lantern. The large architectural photographs, by Mr. W. H. Wheeler, of Oxford, have an especial value for artists and students. Mr. Herbert Watkins has a display of positives printed in silver as well as in carbon; and there is a show, well worth observation, by the Liverpool Dry Plate and Photographic Printing Company, of framed subjects printed from negatives made on "Liverpool" emulsion plates. So much has been said of the drawbacks of climate, in the operations of English photography, that visitors to the Champ de Mars will stare with agreeable disappointment at these specimens, and at others which I may have inadvertently left unmentioned. It may be that chemistry has played an active and useful part in enabling British followers of the practice to counteract all atmospheric difficulties. As examples of the splendid result to be obtained with the collodion of Messrs. Mawson and Swan, this Newcastle firm shows a series of twenty-five admirable portraits, taken by Messrs. Lock and Whitfield, for *Men of Mark*, and certainly as fine as anything produced by Paris or Vienna.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The concluding meeting for the session was held on Tuesday evening last, the 11th inst.,—the President, Mr. James Glaisher, F.R.S., occupying the chair. He (the Chairman) introduced to the members Lieut. Darwin, R.E., as the gentleman who had been elected by the Council to fill the office of honorary secretary, vacated by the retirement of Mr. H. B. Pritchard. He also referred to a letter he had received from Mrs. J. A. Spencer, in which she acknowledged the kind letter of condolence transmitted to her and her family on the recent death of her husband.

Mr. Thomas Bolas, F.C.S., then read a paper *On the Alleged Fading of Carbon Prints*, which will appear in our next number. No remarks followed the reading of this communication.

Mr. J. R. Johnson read a paper *On Alizarine: its Origin, Properties, and Applications.* Until this paper is published, which will be in our next issue, we shall abstain from giving the remarks, by Mr. J. R. Sawyer and Mr. W. S. Bird, made on Mr. Johnson's communication, as these gentlemen's observations could not be properly understood in the absence of the paper by which they were elicited.

The Chairman tendered to Mr. Bolas and Mr. Johnson the thanks of the Society for their papers, and also thanked Mr. Sawyer for his able remarks on the subject. He (the Chairman) stated that the paper announced to be read, and the illustrative exhibition, by Mr. Warnerke would be deferred until a future occasion. Captain Abney, he further said, had a paper ready, but it was impossible to read it at that late hour; it would, however, appear in the Society's *Journal.*

Mr. Werge exhibited a number of negatives taken on Swan's dry plates.

The Chairman having announced that the exhibition of the Society would be opened on October 18th, the proceedings terminated.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The last meeting of this Society, held on Thursday, the 6th inst., was devoted to the revising of the laws and to private business. Hence we do not give the usual report of the transactions.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The eighth ordinary meeting of the session was held at 5, St. Andrew-square, on the evening of Wednesday, 5th June,—Mr. J. Lessels, President, in the chair.

The following new members were unanimously elected:—Messrs. W. Jenkinson, P. Conning, J. R. Cooper, and J. T. Gerard, by Mr. W. Leitch; Mr. Ross, by Mr. W. D. Young; Mr. Henry White, by Mr. Anderson; Mr. Peter Ferguson, by Mr. Tod; Mr. James Abbot, Jun., by Mr. Matheson.

A number of very beautiful prints from negatives produced at the recent outdoor meeting at Tantallon Castle and Tynningham were handed round for inspection, and were much admired.

It was urged by several members present that, if possible, transparencies for the lantern, from the best negatives secured during these interesting trips, should be prepared, and become the property of the Society. It was maintained that very great interest would specially attach to these works of the members from their local associations, and also because many of them are unique, being unobtainable elsewhere, and of very high artistic value. If such a project could be conveniently carried out the Society would soon be possessed of an extremely large and valuable series of transparencies, available for the use of the Society at its "popular evenings," and accessible to individual members for illustration and entertainment. The difficulties in the way of securing uniformly high-class transparencies suitable for the lantern require that some members make this work a speciality in order that justice may be done to the negatives, and that they may be a credit to the Society as a large and influential body specially devoting its energies to the advancement of photography. It was understood that several members would make experiments towards attaining this end, so that by the time the next session opens some simple and reliable method might be perfected providing a soft, pleasing colour and delicate rendering of every subtle detail.

The presentation prints were next distributed to those members who were present, and it was agreed to send a copy to other kindred societies, and also a copy to the editors of the two English journals devoted to photography.

Mr. W. Nelson, in a few graceful remarks, proposed a vote of thanks to Sir Noël Paton for his permission to reproduce the picture forming the subject of the presentation. This was seconded by Dr. Hunter, supported by several other members, and unanimously adopted.

A vote of thanks was then most heartily accorded to Mr. W. H. Davies for the charming way in which he had printed the pictures, and the tasteful manner in which he had mounted them. In reply to a question as to the mounting,

Mr. Davies said that the trimmed carbon prints were mounted upon a suitably-tinted cartridge paper that had previously been stretched damp upon a board and allowed to dry. When the carbon print was dry the cartridge paper was cut out with appropriate margin, and the whole remounted upon the thick cardboard as seen. From his great experience he said he was justified in holding that to be the best way to finish large prints, the beauty of the result amply repaying the extra time and labour involved.

Some conversation next took place concerning the ferrous oxalate developer, the coming outdoor meetings, and the next annual holiday and trip, after which a vote of thanks to the Chairman terminated this, the last, meeting of the session.

The second outdoor meeting for the present season was held at North Berwick, on Thursday, the 31st May last.

The party left Edinburgh by the 7 a.m. train, arriving at Berwick about 8.30 a.m., when, having partaken of breakfast, a conveyance was procured, and a start made for Tantallon Castle. The weather was simply beautiful, and the drive through the delightful country was most thoroughly enjoyed. On reaching the Castle a number of plates were exposed.

The party then proceeded to Tynningham, the seat of the Earl of Haddington. The members were amply repaid, for a more beautiful place they have never visited. Some very choice "bits" were secured in the woods, and with these, and the mansion situated in magnificent grounds, the supply of plates soon became exhausted.

A return drive of seven miles made the party enjoy a substantial and *towsy* tea at North Berwick. Edinburgh was reached about 8.30 p.m., all being delighted with the day's outing.

THE PHOTOGRAPHIC SECTION OF THE AMERICAN INSTITUTE.

A meeting of this Section was held on the 4th January last,*—Mr. H. J. Newton, President, in the chair.

After the transaction of some preliminary business Mr. Roosevelt offered some remarks on the subject of producing tints by fine ruling.

The President: The effect of coloured glass in copying objects with a variety of tints was introduced at the last meeting, since which time I have made some experiments with blue glass in copying. It was claimed by Mr. Chisholm that he photographed a coloured object, or an object with a variety of colours, much quicker when a piece of blue glass was interposed near the diaphragm of the lens. Mr. Chapman

* Through oversight this report was omitted to be published at the proper time. We now give it in order to keep up the continuity of the proceedings of the Section.

doubted the correctness of the conclusions at which Mr. Chisholm arrived, and gave his reasons, which you have heard read in the report. He did not think that the wave lengths of the light reflected from the object were changed at all in their actinic properties by passing through a coloured medium. But there appeared to be such a variety of opinion upon the subject that I prepared several glasses, and have brought one here. I took very thin 8 x 10 glass and coloured one-half of it blue. I covered sections of a chromo. with the blue glass and photographed it. Here is the chromo. and the prepared glass (exhibiting with the resulting negative and print a chromo. entitled *Now I'm Grandmother*, and a piece of glass, one-half of which was coloured blue). He (the President) then explained how he placed the glass over the chromo. so as to have one half of the picture covered with the blue glass and the other with the clear glass, the line running straight down the centre of the chromo., the effect being to turn the reds to crimson, the yellows to greens, and the browns to a darker brown on the half of the chromo. covered with the blue glass. He also covered smaller sections of the picture with blue glass, leaving larger sections uncovered. In making negatives of the chromo under these conditions it would be perceived by examining the negative and print that there had been no perceptible difference in the photographic action between the part covered by the blue and that portion covered by the clear glass. He had always held to the theory that the whole was more than a part, and had always maintained that blue light was not as quick in its actinic action theoretically (he had not tried it) as white light.

Mr. Chapman: Mr. President, what proposition do you make with regard to the oovering the object with glass one-half of which is coloured blue?

The President: That it makes no difference.

Mr. Chapman: Cover half with glass and leave the other half uncovered; is there any difference then?

The President: I took a piece of blue glass and covered one-half of the picture, leaving one-half without glass. There was no difference; there was no line.

Mr. Chapman objected to the experiment, claiming it to have been faulty, and that the blue would make some difference. It would make the same difference in proportion as ten times the amount of blue used; that the length of exposure would materially modify the experiment—a short exposure showing a variation not to be seen by a long exposure. The proper way was to test it by an actinometer.

Mr. Mason expressed his gratification at seeing the result so near as he claimed it would be. He did not understand that Mr. Chapman's proposal to test it with the actinometer would be exactly fair, as Mr. Chapman's actinometer was so constructed that by standing the glass in front of the instrument, the light being at one end, the angle would be continually differing; and if they put the glass perpendicularly to the light, then the polished surface of the glass would refract or reflect more light in proportion to its distance from the gas flame.

Mr. Chapman: I think the picture is made slower by glass being over it in this way. I should prefer to place the blue glass near the diaphragm.

The President explained that the half of the picture not covered with the blue photographed precisely the same as the covered half.

Mr. Chapman: I think that blue glass placed directly in front of the lens would work a little quicker, because the rays of light strike upon it more perpendicularly.

The President: I do not believe that the position of the glass would produce any difference of effect. He (the President) further said: I have another matter, which is in relation to a developer that was given to me confidentially by Mr. W. Willis, Jun., the author of the platinum printing process. It will be recollected that he exhibited a large number of pictures printed by that process at our meeting in May. Immediately after that meeting he came to my house and gave me a new developer for developing emulsion plates, either wet or dry. For certain reasons (stated) I did not feel at liberty to make the process public. A few days before Mr. Willis's return to Europe, in November last, he again called on me. He stated that he should direct the editor of The British Journal of Photography, with whom he had left the manuscript giving all the details of the process, to publish it about the first of the present month. I therefore now feel at liberty to give the process here, as it will undoubtedly appear in the foreign journals before it does in our published proceedings. The composition of the developer is as follows:—Forty or fifty grains of neutral oxalate of potash dissolved in one ounce of water; add sufficient ferrous oxalate to the solution to produce an orange colour. Or a more simple method is to add to the oxalate of potash solution a few drops of a saturated solution of protosulphate of iron, to produce the orange colour. Then add two drops of acetic acid, No. 8, or enough to make a slight acid reaction on litmus paper. This solution is then flowed over the exposed plate in the ordinary manner. The image developes more slowly than with the alkaline pyro. developer, but proceeds satisfactorily and without fog. So far as my experiments go I am inclined to the opinion that a little longer exposure is necessary with this developer than with the carbonate of soda. You will see by the prints exhibited that the action in the shadows and dimly lighted portions is very marked and peculiarly fine. (The President then exhibited a number of negatives produced by this process, and prints from them.)

Mr. Mason: Did you immerse or flood the plates in developing the image.

The President: I flooded them. I have tried it only on wet emulsion plates. My experiments with this developer have been limited. I have not discovered anything peculiar in its action, so far, other than stated, with this exception, perhaps, that it can be used repeatedly without limitation, a little addition of the iron occasionally only being necessary. Neutral oxalate of potash is very easily prepared. The most simple way is to make a saturated solution of carbonate of potash in hot water; then add to this solution oxalic acid in crystals, until neutral. This will give a precipitate of the neutral oxalate of potash, the natant liquid being a saturated solution of the same salt, which can be used by being reduced to the required strength.

Dr. Higgins: Chemically pure oxalate of potash is a commercial article and sells at $2 00 a pound. I would like to ask the President if he had tried the alkaline developer for strengthening negatives made with the oxalate developer before fixing.

The President: I think I did, but I am not quite certain. In reference to the expense of the oxalate of potash, I would say that I have prepared it with both the chemically pure carbonate of potash and oxalic acid and also with the ordinary commercial articles, and discovered no essential difference in the developing properties of either. The cost of that obtained with the commercial salts would not exceed fifteen cents a pound, exclusive of the labour of preparing.

Mr. Mason: What guide had you for determining the amount of the ferrous oxalate?

The President: It does not appear to make a great deal of difference. Ferrous oxalate is not soluble in water, but it is to some extent in the oxalate of potash solution. Mr. Willis said he had introduced it to a gentleman in Paris, a worker in dry plates, well known; he found it was very much quicker than the developer he had been using.

Mr. Chapman moved that the subject of keeping bromide emulsion dry plates after exposure and before developing be placed in the hands of the experimental committee for determining how long after exposure the image could be successfully developed. He had found it difficult to develope the image if the plate were kept several months after exposure. His trouble might be that the preservative solution was not of sufficient strength. He would like to have the subject investigated by the committee.

A vote not being necessary on the motion, the Section then adjourned to the first Tuesday in February. [See report of the February meeting on page 211.]

Correspondence.

Meeting of the Photographic Society of France.

The usual monthly meeting of the Photographic Society of France was held on the 7th instant,—M. Davanne occupying the chair. After the election of two new members, MM. Bocher and Mulnier, M. Perrot de Chaumeux, Secretary for the Foreign Correspondence, read the extracts and translations from the French and foreign journals, which have already been published.

M. Alfred Chardon presented a sealed letter containing the details of improvements in the bromide of silver process, for which he is the "laureate" of the Society, and begged it to be placed among the archives of the Society so as to take date from that evening. He took the opportunity to remark, at the same time, that the account recently given in the *Bulletin Belge* of the process of Mr. Warnerke presented several points similar to his own, but the latter having been described *in extenso* during the meeting held on the 6th of April last year, although lodged for the competition in November, 1876, consequently entitled him clearly to priority of publication.

Among the strangers present were M. Lewitsky, of St. Petersburgh, and Mr. G. W. Simpson, of London.

Remarks on Mr. Warnerke's paper were read, also a *verbatim* translation of the sub-leader thereon which appeared in The British Journal of Photography; on Mr. Carey Lea's papers on ferrous oxalate development; on Dr. Van Monckhoven's paper, read before the Photographic Society of Great Britain; on Obernetter's recent process; on Albert's (of Munich) colouring process;—all of which were reproduced from or have been published in the pages of The British Journal of Photography, and gave rise to several reclamations by the Secretary on behalf of M. Poitevin, M. Ducos du Hauron, M. Chardon, and others.

M. Davanne said that as at the present time Paris was favoured by the visits of representatives of all nations, it had been thought proper to invite to dinner, under the auspices of the Society, the different foreign jurors and distinguished visitors, who, with photography as a common centre of union and attraction, would make its acceptance right welcome. The feelings of the members were unanimously in favour of the proposal. M. Davanne therefore suggested that, as the photographic syndicate had nobly done its duty in the matter of the Universal Exhibition, he had pleasure in proposing that M. Berthaud, its president, and some of its principal members, should be conjointly named *commissaires* or stewards. Accordingly, MM. Davanne, Berthaud, Perrot de Chaumeux, Franck de Villecholles, Audra, Truchelut, and

Bardy were appointed to take the necessary steps requisite to do honour to all concerned.

M. Janssen submitted to the Society an eighteen-inch print of the surface of the sun, enlarged three times the size of the original negative, with an exposure, by the new system, of $\frac{1}{3000}$th parts of a second, and which shows the granulations in certain parts effected by the ascensional currents of hydrogen.

M. Liebert presented to the library of the Society the third edition of his work entitled *La Photographie en Amerique*, which, in contradistinction to that of M. Janssen, is an observatory of mind and photographic matter, and in which will be found the last word on the various new photo-engraving processes.

M. Audra exhibited some English cometless collodion bottles in orange coloured glass, which, under certain restrictions, would be useful to emulsion workers. M. Balaguy, a clever amateur, showed a box of bromide of silver negatives of great purity, the washed emulsion being made by himself and M. Puch. The views were taken in the Avenue of Foreign Nations at the Universal Exhibition. M. Guillot, of Lyons, exhibited portions of 40-yard pieces of unbleached silk impressed with large medallions and portraits the whole breadth of the piece. There was no information supplied as to the manipulation, but M. Michaud said he knew the manufacturer, and believed the impression was with the salts of silver—probably iodide—with development. In my own practice, formerly, I obtained much more agreeable colours with the use of a citrate of silver, and for fans, fire-screens, and library folding-screens secured nearly as good an impression on both sides of the silk.

M. Klary, conjointly with M. Franck, showed a *carte* and cabinet negative, and print therefrom, by the extra-rapid process of M. Boissonnas, of Geneva. No. 1 *carte* received an exposure of two seconds; No. 2 of three seconds; and Nos. 3 and 4 cabinets of five seconds—all for head and bust. The lens used was Dallmeyer's three-inch portrait lens. The exposures took place in the afternoon at 3.50, the sitter being Mr. G. W. Simpson. I think M. Klary is to be blamed for taking these effects at too late an hour of the day, requiring a decided *tour de force* to accomplish the object. The photographer's universal excuse is—catch your personages when you can get them; if not at the hour you would like to have them, catch them when you can. A full length figure of a young girl was taken with a six-inch lens stopped down to four inches on a $14 \times 10\frac{1}{2}$ plate in twelve seconds, and which was well exposed, well lighted, fine in the details, and, added to good development, there was thus produced a well-balanced print, no intensifying being required.

M. Lacan desired to add his testimony with respect to the experiments of M. Klary. He saw the portrait of a lady taken with three seconds' exposure. She was fair, with a light complexion, and wore a dark velvet dress, the two extremes of light and dark meeting in one picture. The photographic difficulties were overcome, and the head-rest might be discarded. M. Lacan, with M. Franck, created considerable amusement by saying they were right glad of the universal dislike of the head-rest which was gaining ground, and which was appropriate during this period of progress. They might now get rid of the head-rest, and supersede it by "a guide." M. Franck added:—"I can now say to my fair sitters—'Ladies, I am most happy to inform you that there shall be no more head-rests; I substitute in its place, with great pleasure, a guide.' This tickles their fancies, and they take agreeably to a simple guide."

MM. Braun et Cie exhibited a collection of their nicely-mounted late impressions in fatty printing ink.

M. Audra then read a short paper on *Precipitated Bromide Emulsion.* [See page 278.]

M. Davanne, referring to M. Audra's statement about the want of vigour when he had neutralised the free silver in his emulsion with iodide collodion, said that he had never had any difficulty with his Taupenot plates. He used one-third iodide with two-thirds bromide. He employed alkaline development, and never had experienced any want of vigour, his plates always behaving exceedingly well.

M. Michaud asked if the remainder of the emulsion at the bottom of the bottle was crystalline.

M. Audra stated that such was not the case, for he had the habit of well shaking up his dissolved emulsions at least three times a week. Long keeping, however, as a general rule, produced granulation, while the emulsion was not limpid.

Professor Stebbing laid stress on the fact that if once the soluble emulsion became limpid it was impossible by re-shaking to re-dissolve it completely, and hence granulation.

M. Lewitsky had experience with the preparations of M. Warnerke, and he believed that that which he had kept since 1877 was better than that newly made in 1878. He found that, to a certain extent, age was decidedly advantageous. His portrait ticket to give him admission as a juror to the Champ de Mars was, indeed, a fine one, and had had only half-a-second's exposure.

M. Marion showed Cadett's patent pneumatic shutter for portrait lens, and also the double-nickeled rollers and hollow steel roller by which heat can be quickly, most efficaciously, and uniformly applied for glazing prints without scratching. The simplicity of the movement upwards and downwards was very apparent. This press merits success in France as well as in England.

M. Peignot exhibited a number of enamelled portraits, possessing perhaps, the purest and richest warm tones that it has been my pleasure to see. They comprised both *carte* and cabinet sizes. He did not divulge his process, but said the charming high lights were pure photography, without retouching or the application of hydrochloric acid to whiten them or to render them more transparent.

M. Michaud read some further observations on his photo-engraving process, as well as on the advantages of square-sided vases for the galvanic battery.

MM. Fouquet and Guetem exhibited what appeared as an elegant enclosed American stereoscopic stand, which would hold glass or paper slides, *cartes*, cabinets, or general views. The ground glass illuminating the transparencies moved backwards and forwards to suit the focal lengths of the graphoscope or stereoscopic lens, with a candle or globe light fixed upon a gilt elbow-jointed arm to swing round to any required point in front of the ground glass for evening use.

Mr. Woodbury's name was down on the programme to present Woodburytype prints on transparent pellicles instead of paper or glass, and also specimens obtained by him during his tour in Italy with Liverpool emulsions. Unfortunately for the members, who highly esteem Mr. Woodbury, that gentleman was obliged, just at the hour of the meeting, to leave Paris to keep an appointment in London. His unavoidable absence was much regretted, for he would have been welcomed with great enthusiasm; however, let us hope that it is an adjournment for a short time only. In his absence I was called upon to make the presentation in his name, and such is the estimate here of Mr. Woodbury's labours, that the President and Vice-President of the Society will esteem themselves happy to become the possessors of his presentation prints. W. Harrison.

Asnières (Seine), Paris, June 11, 1878.

MR. H. COOPER'S CHROME ALUM GELATINE SUBSTRATUM.

To the Editors.

Gentlemen,—I was pleased on reading Mr. Henry Cooper's experience on this subject. If I could find time for experimenting on all that suggests itself to me, besides taking a few pictures sometimes, I should have tried the above substratum some months ago, but with a slightly different object. It would have been shortly after my experience in developing gelatine plates at Gibraltar, of which an account was published in your Almanac of this year.

Among other expedients which I wished to try for preventing the reticulation of the gelatine film in development was that of a substratum of gelatine, rendered insoluble by means of chrome alum. I was prevented from making the trial by much other work on hand, and, as it may still be some time before I can do so, I venture to throw out the hint in case any of the numerous zealous experimentalists in this direction may think it worth a trial.

I may, however, remark that with some of the most correctly-prepared gelatine plates I had failed to prevent the reticulation of the film by means of Epsom salts, notwithstanding its recommendation by those in whose experience I place the greatest reliance, although I used at the same time spring water as cold as I could obtain it.—I am, yours, &c.,

20, *Cornfield-terrace, Eastbourne, June* 8, 1878. Wm. Washam.

SELF-DEVELOPING PLATES.

To the Editors.

Gentlemen,—It will be remembered that, in the issue of The British Journal of Photography for August 24, I referred to a process for producing visible pictures direct in the camera. It will be found on page 408 of last volume. I there ask if it is anything new, but have not received an answer. I now give the formula:—

Prepare an ordinary bath plate; wash slightly, or till greasy lines disappear. Next flow over it a solution composed of—

Glycerine	20 drops.
Catechu (previously softened in spirit of wine)	15 grains.
Water	1 ounce.

Expose as for an ordinary wet plate, or, preferably, twice that time; and at the end of five minutes after exposure all detail will be visible, but thin. An ordinary pyro. and silver redeveloper brings it up to printing density at once. These plates acquire density easier than any other I ever tried. Sensitiveness, success, or failure—all depends on the amount of washing before the organifier is applied.

You cannot over-expose, even if such be extended to one hour in bright sunlight, provided other matters are attended to.

The organifier should be filtered before use, and too much washing makes the plates insensitive. The organifier is not washed off until detail is out.—I am, yours, &c., W. Weston.

Swinton, near Manchester, June 5, 1878.

[We have received a subsequent communication from Mr. Weston, in which he says:—"I am sorry that my engagements prevent me from producing the required proof, and beg to say the formula is reliable; but possibly more glycerine might be an improvement. I will forward a proof—either print or transfer—in a few days."—Eds.]

OXYGEN RETORTS.

To the Editors.

Gentlemen,—I have just had my attention drawn to Mr. W. J. Chadwick's letter in last week's Journal. His statements are, I am sorry to say, incorrect as usual. He says that I was informed officially that I must not exhibit my apparatus, &c. The truth is that I was asked by our Honorary Secretary to choose another night, as some members of the Liverpool Amateur Photographic Association, who were present, had to leave early; and I am sure that almost every member present at the meeting alluded to will remember the President announcing that any member could show what he had brought, or something to that effect. This was after I had promised to have another night.

Again: when I tell your readers that Mr. Chadwick actually handed me a piece of the apparatus I had left out when packing, your readers will form their own opinion of Mr. Chadwick's tale about not being able to give any attention when I showed my patent safety oxygen apparatus.

If those interested will go to the trouble to refer to page 287 of the Journal for 1877, as named by Mr. Chadwick, they will see in my letter something to their advantage; and, as he has repeatedly tried to mislead your readers by saying my apparatus was simply a copy of Mr. S. Highley's gas-holder and Mr. M. Noton's retort, I think in justice to your readers this matter ought to be settled. I would ask them to compare my gas-holder with Mr. Highley's, and they will find it quite different. Mine is very much stronger, and at least thirty per cent. lighter than if made like Mr. Highley's, while mine does not require any screws, nuts, or pins, to put it to work.

As to my generator being like Mr. Noton's, Mr. Chadwick knows, or ought to know, that Mr. Noton's generator could not be re-charged whilst hot, nor could it be used with chlorate and manganese until the same had been made into plugs and dried; whereas mine may be re-charged whilst red hot, and the chlorate and manganese may be used without any preparation.

I have no wish to claim anything that does not belong to me. I am quite willing to test my apparatus against any other, and so save your readers being misled by false statements.—I am, yours, &c.,

Swinton, June 11, 1878. David Young.

EXCHANGE COLUMN.

I will exchange a 20 × 20 mahogany camera and slide for a 12 × 10 swing-back camera.—Address, F. J. Matthews, photographer, Ryde, Isle of Wight.

Wanted, a landscape lens, in exchange for lenses and camera to take three to twelve medallions on half-plate (wants dark slide).—Address, W. Tylar, 165, Well-street, Birmingham.

A four-inch lime-light dissolving view apparatus, splendid set, four different powers, with or without slides and accessories; also, a pair of Carpenter and Westley's improved oil-light dissolving lanterns. What offers in exchange?—Address, A. Wilkinson, 15, Holmeside, Sunderland.

ANSWERS TO CORRESPONDENTS.

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

J. Cooper.—Received.

S. B.—The best cement for the purpose is marine glue.

M. Heslop (Christchurch, N.Z.)—Received. Thanks.

William H. Metcalf (Milwaukee, U.S.A.).—Draft received. Thanks.

J. Roarty (Sydney, N.S.W.).—Amount of subscription received. Thanks.

Argus.—Thanks for the information, which we shall make use of in an early number.

William A. Brice.—We shall try the microscopic experiment indicated, and report the results.

Styx.—Either of the addresses upon a letter will ensure its reaching the person for whom it is intended.

L. T. W.—If the plate had been more thoroughly washed after it was fixed there would not have been any markings apparent.

A. W.—To retain the polish on the steel rub it over with a cloth charged with oil. Before making use of the burnisher wipe it clean with a dry cloth.

M. R. and B. R.—The symptoms indicate a developer possessing a degree of strength far greater than ought to be the case. Reduce it very much. Commence by adding an equal volume of water.

Dunoon.—Phosphorescence is not fluorescence, the two being quite distinct. What you have described is *fluorescence;* and we advise you to try the effect of a very strong solution of sulphate of quinine.

Lenticus.—The occasion for the letter has passed away, and it will be better to allow the matter to rest where it is, especially as no good could result from discussing the special phase to which you confine yourself.

A. M'D.—Return the cards without delay. If they really are such as you describe them to be the firm by whom they were supplied will, for the sake of their own reputation, be only too glad to take them back.

X. Y. Z.—The subject does not possess any interest, except for a few readers—probably not more than five or six. This being the case we must decline acceding to your request to devote an article to it, until some new phase of it turns up in which many would feel interested.

H. Smith.—Mr. Bennett's negative, showing the pouring out of the water in drops, together with a transparency and a print on paper from the same, are still on exhibition at our editorial office. They have been seen by numerous visitors, including the representative of the newspaper mentioned.

An Obliged Reader.—The law in France appears to be this—that if a sitter renowned in art, science, or literature give to the photographer by whom he is taken the right to sell his portrait, that right ceases as soon as the original of the portrait expresses his desire that such publication shall cease.

J. B. M. (Manchester).—No other form of sterescope that has ever been introduced is so convenient, or possesses an equal number of advantages, as the lenticular instrument. Of lenticular sterescopes, no other form that we have yet seen approaches in convenience that of Oliver Wendell Holmes, of America. It is not so well adapted for examining transparencies as the closed-up box, but for prints upon paper it is unrivalled.

Geo. F. Slater.—For wetting the surface of a dry plate previous to developing it we have found methylated spirits of wine answer quite as well as pure alcohol. In our own practice we do not dilute it, but apply it just as it is, returning the spirit to the pouring bottle, which is a six-ounce stoppered bottle having a very wide neck, with a lip well turned over and somewhat broader than usual. We prefer a bottle of similar form for coating the plates from.

H. H. P. (Wick).—Try malic acid. It may be purchased at a cheap rate, or may be prepared by heating the juice of rhubarb stalks, neutralising with carbonate of potash mixed with acetate of lime, and filtering. To this add acetate of lead to form a precipitate of malate of lead, which by the addition of sulphuric acid is decomposed. The crystals obtained upon evaporation are those of malic acid; this will prove for your purpose the best acid with which we are acquainted.

A Tyro.—The cause of the want of sharpness at the sides of the picture arises from the lens having been worked with either too large a diaphragm or with no diaphragm at all. Ascertain the focus of the lens, and then make use of a stop the aperture in which is about one-thirtieth of the focus. This will necessitate your giving a longer exposure, and the resulting picture will be very sharp, even to the margin. Next employ a stop with an aperture somewhat larger than the foregoing—say one-twentieth—and by means of this tentative method you will soon discover the best aperture to make use of.

G. C.—Can you adduce any good reason why the gentleman named should not have secured his invention by patenting it? An inventor has quite as much right to the results of his brain work as you have to the money you make by exercising your occupation of taking portraits. Take your own statement in your letter:—You avow your readiness to have availed yourself of the invention in question provided you could do so without being found out, and, as a consequence, being involved in a lawsuit for infringement. The principle involved in this is the same as that by which certain classes would willingly appropriate the watches and diamond rings of the public were it not for fear of the consequences. Look at yourself in this mirror.

Received.—*Light* (Macmillan); *La Photographie en Amerique*, by A. Liebert; and examples of M. Michaud's new process of photo.-engraving. Notices of these will appear in an early number.

Exhibition of the Manchester Photographic Society.—This Society is to hold an exhibition in August next. All particulars respecting the forthcoming exhibition may be ascertained on application to the Honorary Secretary, Mr. Charles Adin, Memorial Hall, Manchester.

The Boissonnas Process.—It will be remembered that about twelve months ago we spoke in terms of high commendation of a number of groups and instantaneous portraits taken by M. Boissonnas, of Geneva, by means of a process by which an exceedingly brief exposure was required. At that time it was intended to introduce the process into this country to all who, upon certain terms, chose to become acquainted with it. Owing to the incertitude of the results this intention was not fulfilled. We now learn from M. Boissonnas that he has entirely altered the process—indeed to such an extent that it may be considered as no longer the same process as formerly. As the method is now being daily worked by MM. Klary and Franck de Villecholles, in Paris, we strongly advise those of our readers who are about to visit the "gay capital" to avail themselves of a cordial invitation given by these gentlemen to visit 18, Rue Vivienne, Paris, and see it in action.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 946. Vol. XXV.—JUNE 21, 1878.

GENERAL ARRANGEMENTS FOR FIELD WORK.

A fortnight ago we devoted an article to the subject of preparations for outdoor work intended specially for those of our readers whose practical experience in that direction is limited, and we now supplement our previous article by a few remarks upon the arrangements necessary when actually in the field. Before speaking of the apparatus we may premise that our observations are made with a view of assisting, in the choice of appliances, those who may not be completely fitted out rather than with the desire of altering any existing arrangements; and our hints will be of value to those who may be at a loss to decide upon the instruments which will best suit their individual circumstances.

The first point to be considered is the part which photography is to play in the matter—whether it forms the chief and primary object of the tour, or is only a secondary consideration to be utilised when circumstances shall admit in securing permanent mementoes of a pleasure trip. In the latter case the photographic arrangements must be of such a character as to interfere as little as possible with the comfort and convenience of the tourist, and, in the majority of instances, the pocket camera will be selected as most nearly conforming to these conditions and, at the same time, satisfying all pictorial requirements. But when the main object of the journey is the production of pictures in the true sense, in contradistinction to casual "shots" by the way, the small-sized plates we have mentioned cease to be worthy of the extra care and trouble which the artist is willing to lavish upon them. In casting about for the best size to work the novice at tourist work is apt to err in the opposite direction, and, by attempting too much at first, to spoil the results of the whole trip and probably also to acquire such an experience as will deter him from ever making a second attempt.

The advice we would give to the young amateur about to make his first essay away from home is to be moderate in his ambitions, both as regards size of picture and quantity of work to be done. In a general way it is, of course, impossible to say what size of plate is the best to work, or that any given size better satisfies pictorial requirements than another; but in the present instance we have no hesitation in saying that, for the sake of comfort and convenience, to say nothing of the quality of the results obtained, the whole-plate is *quite* large enough for any one to try his "'prentice hand" upon. We would even recommend one of the smaller "cabinet" sizes—$7\frac{1}{4} \times 4\frac{1}{2}$ or $7\frac{1}{2} \times 5$—which, while making a very pretty single picture, combines the advantages of the stereoscopic plate as well.

The actual weight of the apparatus forms a comparatively trivial item in the argument in favour of small plates, though even on that point a week's experience of travelling photography will be amply sufficient, probably, to develope some new ideas as to the real amount of labour involved in the transport of even a $7\frac{1}{2} \times 5$ camera and its adjuncts. The real difficulties are found more in connection with the packing and safe stowage of the plates and of the numerous *etceteras* which an absence of two or three weeks from home render indispensable, and these difficulties become greater in proportion to the size of the plate.

We may be allowed to say a few words upon the subject of lenses—not from a theoretical, but from a purely practical, point of view. If the amateur desire to be complete in his equipments and in a position to secure *any* subject which may be presented to him he will, of course, require a variety of lenses for each size of plate he works. This not only entails very considerable expense, but adds greatly to the bulk and weight of the *impedimenta* which it is his chief object to keep down as much as possible. But the question presents itself as to whether it is desirable that the amateur—at least the inexperienced—should go thus armed *cap-à-pie* ready to tilt at anything and everything. We think not; rather should he be content to attempt only such subjects as his means, whatever they may be, enable him to do successfully, and to have the courage to pass by those which are beyond his powers.

Lenses may be divided into three classes—wide, medium, and narrow angle—each of which has its advantages for special classes of work. In selecting a lens, then, which is to do the whole, or, at anyrate, the greater part, of the work some attention should be given to the class of subjects it will be principally required to render. In mountainous districts or for open landscapes the most pleasing and natural results are undoubtedly obtained with long-focussed lenses, as the angle of view included approaches most nearly to that given by the eye. But a great variety of pure landscape subjects require a wider angle for their proper rendering, or what we term a "medium" angle. Wide-angle lenses properly so called are wholly unsuited for general landscape work, and though *occasionally* of the greatest use, their injudicious employment has done much to bring discredit upon landscape photography. For architecture, especially in confined situations, they are, of course, invaluable; but unless the amateur intends to confine himself to that class of work he would be unwise in the extreme to select a short-focus lens as his only one.

The most suitable lens for general work will, therefore, be a medium angle; for a $7\frac{1}{2} \times 5$ plate eight or eight and a-half inches will be a convenient focus, and if the lens be chosen of the doublet form, giving straight lines, it will be equally adapted to landscape work and to architecture when the subject is not too much enclosed. For pure landscape nothing excels the old single combination. A most useful adjunct to the lens—in many cases an absolute necessity—is a sunshade. These are frequently supplied by the optician; but, failing that, an efficient substitute consists of a tube of stiff material—stiff paper, for instance—fitting upon the front of the lens in place of the cap, and cut away transversely, so as to shade the sky portion of the plate without interfering with the view. The projecting portion may be turned in any direction, so as to arrest the direct rays of the sun; and when not in use it may be folded and placed away, and occupies literally "no space." The inside should, of course, be blackened.

The next point of importance is the package and conveyance of plates. With regard to those required for the day's use it is a matter of taste whether a changing-box or double slides be used; each method has its advocates, and provided the workmanship be equal in each case we cannot see that either possesses an advantage which may not be balanced by another on the other side. The package and carriage of the reserve plates, however, is a matter which has exercised the ingenuity of many, and in connection with which there-is still room for considerable improvement. Grooved plate-boxes, though perfect for mere storage, are far too bulky for purposes of transport; hence many attempts, more or less satisfactory, have been made to dispense with them.

The simplest plan, and the one which may be taken as the type of the rest, consists in packing the plates in pairs, face to face, with a narrow strip of thin cardboard or folded paper between the edges; this is liable to the objection that unless the packing is very carefully performed the strips of cardboard find their way from the edge to the centre of the plate, and there leave an indelible mark upon the tender films they are intended to protect. An improvement upon this is the method adopted with some of the commercial plates, in which a strip of stout paper is folded zigzag fashion, like the camera bellows, and the successive folds inserted between the edges of the plates. Perhaps the most perfect method in action, but a rather costly one, is to insert between each pair of films a "mat," formed by cutting out the centre of a piece of cardboard the exact size of the plates in such a manner as to leave a margin an eighth of an inch wide all round. If such "mats" could be supplied at a moderate price they would last for a very long time, and would practically remove every difficulty in the package of our dry plates.

Numerous other plans of a similar kind have been recommended from time to time, but we need not weary our readers by describing them. Whatever system be adopted, two or three pair of plates thus separated are wrapped up together in brown or orange paper, each package being marked with a distinctive letter or number for future identification. It will be found more convenient, and perhaps prevent accidents, if the plates are divided in fours or half dozens as we direct, instead of into dozens as is frequently done. It is not often that the tourist succeeds in exposing a dozen plates in the day; and, consequently, in opening a package of one dozen unexposed plates to replenish his slides he must either repack his exposed plates separately and increase his number of parcels, or else mix exposed and unexposed plates together—either of which courses leads to confusion.

We next have to provide the means of identifying each individual plate in order that the development may be performed with some idea as to the subject, exposure, and treatment it is likely to require. If the plates are "backed" with colouring matter nothing more is needed, as the latter forms a convenient surface upon which a distinguishing mark or any particulars may be written with a lead pencil. Failing the "backing," a small label must be attached to one corner of the back of the plate; on no account should it be placed in the centre, as it is then liable to cause a mark from unequal reflection.

There remains but one more point which comes under the head of preparations, and upon that our remarks will be brief; we allude to the means of carrying the apparatus when "on the march." By all means adopt the knapsack plan; the gain in comfort can only be estimated after a practical trial. Upon a level road nothing is necessary but the ordinary shoulder straps, but if there be any climbing to be done the addition of a belt or strap to keep the knapsack firmly against the back will be found an improvement, especially in going *down* hill. We have in this manner "done" twenty miles a-day without the slightest discomfort, and carrying a weight which *in the hand* would have necessitated a rest at least every half-mile.

MIXING EMULSIONS.—A CURE FOR PINHOLES.

Those who have experimented much with emulsions, or even with collodions of any kind, have found that a great accumulation of bottles and samples takes place.

There are very few photographers, especially amateurs, who do not possess what they designate with more expressiveness than Latinic elegance and accuracy their *omnium-gatherum* stock-bottle. It is that which forms the common receptacle of all the fag-ends of the contents of bottles of collodion by various makers, and iodised by formulæ of the most diverse kinds. It is in accordance with the experience of many that the "*omnium-gatherum*" collodion is frequently found to possess the good qualities of almost all the component parts of which it is formed, with an entire lack of the bad properties of any; and it has often been with a sigh of regret that the last drop of this heterogeneous mixture has been used. This has led to several photographers mixing together, *ab initio*, the preparations of three or four different manufacturers, and using this mixture in preference to the collodion of any special maker—a practice adopted by some of the most successful artists of the present period.

Such a mixture as that described we recently made, collodion emulsions rather than bromo-iodised collodions forming the component parts of the "*omnium gatherum*." Into a large receptacle we poured the whole contents of seventeen bottles, containing washed emulsions prepared according to different formulæ. Some of these samples were organified, others were not; some were three or four years old, others did not number so many weeks. Knowing, as we well did, the diversity and variety of the materials of which this mixture was formed, we were very curious to ascertain what sort of negative would result from a plate coated with it; and to our surprise and no small delight we have found that it produces most excellent pictures. The negatives are rather too thin for printing if developed with alkaline pyro. alone; but when we use this for developing the image, and follow it up with acid pyro. and silver to intensify such image—a mode of procedure we have long recommended, and which is now very generally adopted—the negative acquires printing intensity to any desired extent.

In connection with this subject we desire to record the means we have adopted to overcome a certain peculiarity possessed by one particular washed emulsion that is exceedingly sensitive, and which yields images of the most charming description, but possessing the unfortunate and most serious fault of giving negatives full of transparent holes—not "pinholes," but circular holes of about the apparent dimensions of a pin's head—similar to those to which we have previously drawn our readers' attention, and whose precise nature and cause have not yet been discovered. Reasoning from the well-ascertained fact that such defects are never found in an emulsion plate that has been washed after the film being formed upon it, and previous to the application of the organifier or preservative, we coated a plate with the emulsion in question, and after the film had been allowed to set we immersed the plate to the extent of one-half only in a bath of water, where it was allowed to remain until all the greasy appearance had disappeared; after which we treated the washed end with a ten-grain solution of tannin, and allowed the plate to become thoroughly dry. Having exposed this plate in the camera we found, upon developing and finishing the picture, that the holes, which are in reality "aureoles," were as plentiful as ever upon the unwashed end of the plate; while upon that which had been treated in the manner just described there was not only no hole visible, but upon scanning the surface with a powerful magnifier there was not even an approach to that or any other surface defect of a similar description. The collodion emulsion with which this experiment was tried is one that is, but for the single fault indicated, so very excellent that we are much pleased at having found a way by which it can all be utilised.

Since the date of the experiment just recorded we have tried several further experiments in the same direction, employing different preservatives and organifiers. Among those to which we at present give the preference are (first) a strong infusion of coffee, and (secondly) common table beer to which has been added pyrogallic acid, as recommended by Canon Beechey. By making use of either of these preservatives we have obtained negatives possessing such admirable gradation, and with such entire freedom from spots, that we can unhesitatingly advise the use of these under the circumstances mentioned.

Conversing recently on this subject with Colonel Stuart Wortley that gentleman suggested, from the result of his experience, the washing of the plate without the application of any preservative subsequently. While we quite believe that he is right in cases where the plates are not intended to be kept for any length of time after their preparation, we are inclined to think that, quite apart from its organifying influence, the mechanical part played by the preservative as a varnish to shield the bromide of silver from the action of the atmosphere renders its use indispensable in all cases in which it is desired that the plates be kept for several months, or even weeks or days, after preparation.

We desire it to be understood that the treatment described is recommended solely for the purpose of getting rid of a certain defect, and that we should not think of washing and organifying a film obtained by an emulsion which gave freedom from spots. That collodion emulsions of such a character are to be met with we cheerfully acknowledge; but in the fact that other emulsions giving spots are also to be encountered will be found the *raison d'être* of this article.

RETOUCHING.

Our opinions upon the value to be set upon a retouched negative have been sufficiently frequently enunciated to need no repetition, but the process has taken firm root in all directions, and for good or for evil must be accepted; and, as it is always our aim to put our readers *au courant* with the practice of the foremost workers, it is our purpose, in this present article and in one or more to follow, to give practical and succinct instructions how to set about retouching according to the mode of the leading artists. We shall not confuse our readers with a multiplicity of processes, but shall give them working details of one leading method of procedure.

There are so many cases where an accidental blemish may be easily remedied by careful retouching that, apart from the power of working upon the face of a portrait, it is well to know how to handle the pencil to free the negative from such defects, and we have conquered the antipathy we, in common with so many, have felt against retouching in general owing to its abuse in particular cases; and that our readers may know the best manner of working we have supplemented our own practice by a knowledge of the mode in which the "amelioration" of negatives is practised by the first retouchers.

The legitimate functions of retouching are the removing of blemishes and the correction of such inequalities as those caused in photographic reproduction of colours, which are often untrue to nature. Its debatable sphere is the softening of shadows and lines in the feature, in conjunction with attempts to alter the expression. Whatever the instructions we give our readers should bear in mind that, though it is an old sin of the painter to flatter his sitters, a photographer should never forget what is due to his own especial art.

Retouching has been done by the aid of both brush and lead pencil; but, still, as the latter is so much easier of attainment, we shall only dwell upon its use, though we believe we are correctly informed that one of the earliest—if not *the* earliest—systematic retouchers in this country, whose photographs have a deserved repute (Mr. Edge, of Llandudno), used the brush and Indian ink almost entirely for many years. But on the continent the use of the blacklead is universal, and since the secret of its employment is now so completely disclosed it is not likely that Indian ink, except under certain circumstances, will ever again be employed.

The first and most important operation to be carried out is to prepare the surface of the negative so as to enable the pencil to bite. There are two methods of doing this, either of which may be made use of. The first is to roughen the varnish by an abrasive powder—finely-powdered pumice stone, such as is to be purchased at many chemists' shops, being most preferred. It is important that the right material be purchased, there being a coarser and rougher kind made for the use of cabinet-makers, which is quite unsuitable, and would scratch the negative. It is employed by putting a pinch, or dusting a small quantity out of a muslin bag, upon the place to be worked upon, and then rubbing it with the end of the finger with a circular motion till the surface is deadened, and a tooth like fine ground glass is given. The entire absence of gritty particles must be ensured, or minute scratches which would ruin a face would be the result. This method enables the greatest amount of opacity to be produced by the lead laid on, and hence is best for those negatives where large masses of bare glass have to be covered.

The second method to be described may be used in the majority of cases, and the abrasive method only occasionally, or the latter may be made use of entirely. We recommend the second method, with the very occasional employment of the other. The formula for the composition to be used is gum dammar, twenty grains; Venice turpentine, five grains; turpentine, one ounce. The gum is to be powdered and the mixture well agitated for a few minutes; it will then dissolve quickly, and the Venice turpentine will easily liquefy and mix with a little shaking. If any difficulty be experienced in getting true Venice turpentine it may be replaced by one-half of its weight of ordinary black resin. A drop of the solution is placed on a small pledget of cotton wool, and rubbed for a moment over the surface to be worked upon so as to leave a mere visible trace behind (if too much be put on, the surface will be too sticky or tacky). The negative is placed aside for a few minutes and is then ready for use, and a number of negatives may be done one after another so as to save time. A score of them may be treated in a couple of minutes, while with the pumice-stone process each negative occupies perhaps half-a-minute or more—a length of time which when many require to be treated becomes a serious item.

An important point to be considered with regard to this treatment is—Does it injure the negative or render it liable to crack? The infinitesimally small quantity of gum left behind after the rubbing is not likely to harm any varnished surface, but, to render the matter entirely free from doubt, we have made inquiries among professional photographers who have employed the plan, and we have ascertained that, at anyrate in five years, which was the oldest case we could trace, no harm whatever had occurred to the negative. Hence we may safely subject the most valuable negative to the process without any fear of danger.

Some retouchers make a special varnish which requires no after-treatment to enable the pencil to bite; but our experience of such is not favourable. We do not consider them likely to be so durable as other well-known, recognised negative varnishes, and the saving of time is so very slight that it does not counterbalance the inconvenience of having two kinds in use—one for negatives to be retouched, and one for ordinary work—and they possess no other advantage over the methods we recommend.

We know one gentleman who possesses a touch so fine that he is able to retouch upon the dried film of an unvarnished negative, and we have seen one of a group where a large number of faces were so retouched by him; but this is a mere *tour de force*, not to be attempted in ordinary practice, and only made use of by the artist in question under unusual circumstances.

We conclude this part of the subject by describing a method suitable for occasional employment by any one who wishes to improve a negative and has no special materials at hand. It is simply to dilute ordinary negative varnish with about an equal part of methylated spirit, pour on the negative *cold*, and allow to dry spontaneously. If the right proportion of spirit be employed a surface of most exquisite delicacy is obtained, but of rather too fragile a nature for ordinary workers. It possesses the advantage of being able to withstand a second coat of varnish applied with heat in the ordinary manner, and thus secures the retouching from all danger, with even the utmost amount of hard printing. On this latter account it may, at times, be of great usefulness, the other methods not allowing of any fixing of the pencilling beyond that of mere surface nature, and for this reason we may give a little more fulness of details, the gentleman who communicated them to us informing us that he employed this method for one or two years, and liked the surface better than any he had ever worked upon previously.

The great point is to have the varnish diluted to the exact strength, and this can only be found by experiment. If too strong the varnish dries too bright; if too weak it leaves a dead and rotten surface, easily scratched, and taking too great a hold of the blacklead. Further: when a negative is under-exposed or forced in the development the film has a different texture and requires a modification of the varnish, greater strength being then needed. Instead of thickening the varnish, a second coating—always cold—will almost, but not quite, answer as well.

The drawbacks to this process are the nicety required in adjusting the strength of the varnish and the great tenderness, even at its best, of the surface, which should be exactly analogous to the gloss of an eggshell, and is most beautiful to work upon but for one defect, a special pencil being necessary. This part of the subject, however, will be dwelt upon in our next.

In another column Mr. W. Washam reverts to the old idea of a sensitive substratum (or, in other words, a double film), for the purpose of securing certain advantages not possessed by a single film. We speak of the idea as being old, because the Taupenôt process—one of, if not *the*, earliest of dry processes—was essentially a double-film process, though the conditions pertaining to that method are widely different from those proposed by Mr. Washam. In the latter case the particular part to be played by the sensitive gelatine substratum is the formation of an intense image; but in this anticipation we cannot avoid the conclusion that the author partly loses sight of the distinction which he himself draws between density and intensity. The experiments of Captain Abney in connection with double films, in addition to explaining much that was previously obscure, showed us the action which an exposed film has upon an exposed one placed in contact with it during development. Judging from recollection of the behaviour of these double films, we can readily understand that an exposed gelatine emulsion film, coated after exposure with a slow, dense collodion emulsion, would develope an *intense* image; but, by adopting Mr. Washam's suggestions, we should expect to obtain a *dense* image, which might or might not be intense according as other conditions favoured intensity. In fact, we should anticipate no greater difference than would exist between the results given by two films of different thickness. We do not attach the same importance to the order in which the films are applied as Mr. Washam does—at least for the same reasons. A dried collodion film does not possess sufficient absorptive power to so far arrest the rays passing through it as to protect a second film placed under it; and, even granting that a gelatine film is capable of exercising a greater arresting power, the result, we apprehend, would be merely a slight diminution in the sensitiveness. We shall probably in the course of the next few weeks have an opportunity of practically testing Mr. Washam's suggestions, and shall then be in a position to speak more definitely as to their value.

RENDERING THE DAGUERREAN IMAGE VISIBLE BY THE ACTION OF RED LIGHT.

Though rather pressed for time it would be discourteous to Mr. Berkeley—whose experimental work and deductions therefrom we all admire—if I did not give a short reply to his last communication, in which there is much food for reflection, and which requires more time than I can give at the present moment entirely to digest. Either Mr. Berkeley or myself have misinterpreted Becquerel's experiments, to which we both have referred. I will give my version of them as I read them.

The film used was silver iodide on the surface of a silvered plate which had a short exposure given to it in the camera—hardly sufficient to give a visible image. The plate so exposed was placed beneath red glass, and the image appeared by the action of the red transmitted light, and not by mercurial development. This is the way in which I think the experiment was carried out, since this is explicitly given in Gaudin's repetition of them. The oxidised image, in other words, was a visible image, according with the results I have obtained. The image on an iodide plate, when just visible, is of a dark colour, and the invisible image should be made up of the same material hidden by the unaltered compound, and this dark compound would absorb red light and necessitate the expenditure of work upon it, either in the shape of rise in temperature or in producing chemical change. This latter seems to be the case where oxygen is absorbed, which my later experiments seem to show. In the coloured spectra I have produced this is unmistakably the fact, and there seems to be no reason against it in the form of experiment which we are considering.

I am not quite certain whether Mr. Berkeley's experiment with the bromide plate (cutting it into three pieces, and treating each piece in a different manner) is a suppositious one or not. Some time ago when he suggested a similar one I tried it, and the conclusions that he arrived at were not entirely borne out in my hands, as I found the image developed upwards and downwards. Any deficiency in the latter direction I attributed at the time to the fact that the developer when it arrived half way (say) through the film was weakened by dilution with that already employed to develope the image above, and that there was also an increase of soluble bromide formed in the act of development. In transposing the top and the bottom surface of the films this would not be the case, since the developer would arrive at the image in an undiluted form, and the reducing action would take place more equally in both directions.

These experiments I shall repeat when there is an opportunity, and until then I should not like positively to commit myself. Perhaps Mr. Berkeley would kindly say whether he has tried these experiments himself, and repeated them more than once. Instead of using the words "*absolute contact*" of the silver bromide with metallic silver, I should probably have been wiser had I said "when the silver bromide and metallic silver are within the sphere of sensible action of the molecular forces."

W. de W. Abney, F.R.S.,
Capt. R.E.

ON ALIZARINE: ITS ORIGIN, PROPERTIES, AND APPLICATIONS.

[A communication to the Photographic Society of Great Britain.]

The English traveller who visits for the first time the South of France, and particularly the fertile district round Avignon, will be surprised at seeing large tracts of land covered with the foliage of a plant entirely unknown to him. On inquiry, he will find that this novel agricultural product, so largely cultivated, is the celebrated "garance," the *Rubia tinctoria* of botanists, and the madder of the English calico printers—one of the most important of their dyestuffs.

In France it is very largely used to dye wool of the red tint so well known in consequence of the trowsers of the French army being made entirely of cloth dyed of that colour; so that, with our neighbours' "*porter la garance*" (to wear madder) is synonymous with being a soldier or becoming a soldier. It is also used for dyeing the red, purple, and blacks of our bandana silk handkerchiefs; the fast purples and pinks of our cotton prints; the perfectly permanent red, pink, lilac, chocolate, and black tints of our often gorgeous furniture prints; and, lastly, it furnishes colouring matter of the brilliant and universally-appreciated Turkey red.

The colouring principle of the plant resides chiefly in its roots; these are taken up from the ground at the proper season, dried, and sent to market either in their natural state or ground to powder, and packed carefully in air-tight casks.

France and Holland send us large quantities of ground madder. From Greece and Turkey it comes to us in its more natural state, under the title of "alizari," by which it is known all over the Levant; hence, when the colouring matter of this dyestuff was first isolated, it received the name of "alizarine."

It would waste your time and try your patience to describe in detail the various processes by which these brilliant tints are produced from this apparently colourless, or but little coloured, root, although to a chemist they are highly interesting and instructive. It will suffice our purpose to say that they consist—

1. In operations by which the colouring matter is converted from a dormant or merely potential state to one of activity, just as starch and dextrine are converted into sugar by diastase, and by an analogous action and transformation.

2. In fixing of the colour on the fabric, by first impregnating it totally when it is to be dyed, but only superficially or topically when it is to be printed, with a base or mordant, and when this is fixed within or upon the textile fibre by saturating it with alizarine, in an infusion of madder roots gradually heated to boiling point in a bath formed of an infusion of madder roots. For red and its various shades, such as pink and rose, the mordant employed is a salt of alumina, and usually the acetate; when violet, purple, or black is wanted the acetate of iron is used—very feeble solutions giving the former tints and strong solutions the latter. For chocolate, brown, and maroon a mixture of the two acetates is employed, the proportions varying with the shade and depth of colour.

3. In the clearing, purification, or development of the true colour from the brown matters with which it is associated, by treating the dyed cloth repeatedly with boiling soap lye and solutions of hypoclorite of lime or soda alternately, the brown matters are attacked by these reactives, and are removed or destroyed; while the alizarine compounds to be fixed on the cloth are only purified, and enhanced in brilliancy of hue.

When we say that, before Berthollet discovered the value of chlorine in dyeing, madder prints were exposed for several days upon the grass between each treatment with boiling soap, it will be seen how highly resistant the alizarine pigments are to light, which bleaches so many colouring matters.

Alizarine is not only one of our most important dyestuffs, but it is also the colouring principle of many of the most delicate, the most brilliant, and, at the same time, the most permanent tints of the artist's palette, whether he employ oil or water as his vehicle or medium.

You see before you some fine specimens of madder lakes, manufactured and kindly lent by Mr. J. Newman, of Soho-square:—

1. You have here brown madder, which will give you some idea of the natural colour of madder lake before the clearing processes have been applied thereto, although in this case the base is neither alumina nor iron.

2. Here you have Rubens madder, a fine red, alumina being the base.

3. Here you have purple madder.

4. Here are the splendid tints of rose madder, pink madder, &c., of which the base is also alumina.

The pigments you see here only differ from those on the fabric by the fact that the mordants or bases are in one case attached to or sealed, as it were, within the cells of the textile fibres; while in the case of the pigments these bases are free, and combine directly with the colouring principle, as in any other chemical species. The combination is usually effected by dissolving the colouring principle in a solution of alkali, and adding thereto a soluble salt of the base. The base and colouring matter are precipitated together, and the compound so formed is called a "lake." This name originated from the fact of the soluble colouring matter of a particular species of coccus which the natives call "lac" *(Coccus lacca)*, which was sent to us from India, in a dry, portable form when so precipitated, under the name of "lac-dye."

Nothing is more easy than to prepare these lakes, yet few things more difficult than to obtain them of the brilliance and purity of the specimens before you—a valuable trade secret.

Even to make an inferior article the madder must undergo—

1. A series of washings to get rid of the soluble impurities when the insoluble colouring matter has been developed.

2. The extraction of the colouring principle, and its precipitation combined with a base.

The preparation of the lighter shades of madder lake is greatly facilitated by the fact that a solution of alum—and particularly alum made neutral by the addition of an alkali until the alumina begins to precipitate—dissolves readily a quantity of alizarine, forming a solution of a fine cherry red, from which acids precipitate the alizarine in nearly a pure state, while alkalies and their carbonates precipitate it as a pink or rose lake.

The necessity of the long and costly operations for the purification of madder colours, whether as dyes or pigments, induced many chemists to endeavour to effect the isolation of the colouring principle in a pure form, so that by using the pure extract instead of the complex natural product the tedious operation of purification might be dispensed with. Robiquet, a French chemist, first published the results of his researches. He believed that madder contained not one essential colouring principle but two, to which he gave the name of "alizarine" and "purpurine" respectively—evidently modifications of one substance. Although Robiquet failed to establish the extraction of the pure colouring matter as a practical manufacture, he nevertheless obtained it in an intermediate or partially purified state, which, under the name of "*charbon-sulfurique*" or "garancine," subsequently became a most important article of manufacture and commerce.

This manufacture was founded on the fact that the colouring principle of madder dissolves readily, and without change, in sulphuric acid, and is precipitated therefrom by water. It was only necessary, therefore, to treat the powdered madder with this acid, and throw the mass into water, to obtain the colouring matter, mixed with carbon, the acid having destroyed or rendered soluble all the other components of the plant.

A long list of chemists might be given each of whom contributed somewhat to our further knowledge of this interesting subject; but all these researches were thrown into the shade, and the importance of the plant itself greatly diminished, by the discovery of a German chemist that alizarine could be manufactured artificially out of a product of coal tar. The changes rung upon the elements of pitch, by which that substance is converted into the splendid colouring matter we have been discussing, are of the highest interest to the chemist, but we have not time to consider them. Suffice it to say that the process is thoroughly practical, is performed successfully on thousands of tons of the raw material, and is already, although in mere infancy, a most important manufacture.

By means of scientific research, so often sneered at by practical men, we thus arrive at a process by which a bit of coal can be converted into the substance which yesterday we only obtained by careful preparation of the soil, by skilful husbandry, by careful manipulation in drying, grinding, packing, and by sundry elaborate operations, the result of the labours of many minds. May we not consider the artificial preparation of alizarine as one of the greatest triumphs of modern chemistry?

The practical photographer will naturally ask—How does all this affect us? What have we to do with alizarine and artists' pigments? We reply, that since the introduction of photographic pigment printing every photographer who has adopted the new system has a direct interest in every new permanent pigment which the chemist may discover. Henceforth the operations of the artist and the photographic printer are intimately associated. One may exercise genius in the production of works of high art, while the other performs a merely mechanical operation; but the object is the same, and the means employed are nearly identical. Each endeavours to produce "a thing of beauty," and whether that shall become "a joy for ever" entirely depends upon whether the pigment employed be permanent or fugitive. The same pigments are employed by each, with certain exceptions; and each employs a vehicle or medium to mould his pigment, and fix it upon the paper or canvas he employs. The painter in oil uses a siccative varnish, which oxidises, dries, and becomes insoluble in the ordinary menstrua of oil. The photographer uses gelatine and a chrome salt—a mixture which becomes insoluble under the action of light.

Now, it is as important to the photographer as to the artist that the vehicle or medium employed be colourless, or as nearly so as to have no appreciable influence upon the hue of the pigment employed. This condition is fulfilled in both cases. The varnish or megilp of the artist is usually of a slight yellow colour in mass, but having no sensible influence upon the colour. The same may be said of the medium of the pigment printer. After washing his prints in warm water and passing them through a bath of alum, the medium, which consists of insoluble gelatine and oxide of chrome, is of a very pale green colour, which might degrade somewhat a delicate shade of rose madder, but has no more action upon the brownish purples of the photograph than so much tawed leather—a compound of gelatinous matter and alumina, which it closely resembles in nature and properties.

I particularly insist upon this point, because it has been alleged by an eminent authority that the medium in question is yellow, and that it has a destructive action upon all colours employed with it of organic origin. I will merely observe, to show the utter incorrectness of the statement in question, although this has been already fully pointed out by competent authority, that if the medium were yellow it would be impossible to obtain pigment prints of a brilliant blue colour—for blue and yellow form a green or greenish colour—and if it had the deteriorating action upon alizarine and other organic matter, as asserted, it would be equally impossible to obtain permanent proofs of a brilliant crimson; yet a frame containing impressions in both these colours, from a negative of Mr. Bedford's, the *Old Mill*, printed by Mr. Swan in 1870, hung for years in the windows of the galleries of the Autotype Company, both in the Haymarket and in Rathbone-place, and must have been seen by all present, and prove conclusively not only that such prints are obtainable but also that when obtained they are perfectly permanent.

Having shown the importance of permanent pigments to the photographer, I will now proceed to show how such a pigment may be procured from alizarine; for, unfortunately, none of the madder lakes I have shown you can be employed successfully for that purpose. The crimson, rose, and pink lakes, which have alumina for their base, when mixed with a small quantity of very black pigment on the palette of the painter and diluted with this medium, yield most brilliant tints, quite equal to those yielded by cochineal, and those which the photographer obtains from albumen and chloride of silver exposed to light and toned with a salt of gold; but when these pigments are mixed with the photographer's medium insolubility ensues without exposure to light, and the pigment paper no longer performs its functions.

Such, at least, has been my experience and that of others. I have always hitherto explained this action by supposing that when the alumina was in sufficient proportion to the alizarine to constitute a permanent pigment, such pigment, when mixed with gelatine and an acid chrome salt, yielded a portion of its base to the acid of the salt, and precipitated the gelatine, as acid salts are well known to do.

The process by which Mr. Swan obtained permanent prints in alizarine having been found to yield uncertain results, unless the greatest care was taken, I succeeded in preparing an alizarine compound in 1872 which was free from this defect, which had no action upon the gelatine medium, which gave beautiful and permanent colours, and which, although capable of yielding double transfer prints of the most brilliant tints; yet this compound appears to have been ignored or abandoned by the company, for on the technical manager of the company visiting me in Paris, in 1876, he was unacquainted with it as a manufactured article. Hence it is not surprising that, on the publication of the fifth edition of their *Manual*, the practice of the art had so far been altered that, in answer to many queries as to the want of permanency of pigment prints, its chief promoters had to admit that to obtain what was termed an "exaggerated" brilliancy fugitive colours must be had recourse to. I would ask whether any brilliancy beyond that yielded by silver and gold upon albumen has been asked for or attained.

I am aware that this admission is now withdrawn and a better practice instituted, but not without some exceptions, for special licensees are still supplied with fugitive pigment papers at their own request. At anyrate, so long as the new practice is maintained a trade secret, I hope that it will not be deemed superfluous for me to describe the mode of obtaining permanent pigments with alizarine, and to explain the conditions necessary for that object.

First, let me say that alizarine, like a great many dyestuffs, is not permanent alone, but must be combined with a due proportion of base. It is not sufficient merely to precipitate the alizarine from its alkaline solution by so much alum as is necessary for the purpose, for alizarine is precipitated by acids, and alum is an acid salt. The lake so produced may be very intense and brilliant, and may be perfectly insoluble in water; but, if it be insufficiently charged with base, it is not the true permanent lake, but that substance mixed with a quantity of the uncombined colour which will yield to the action of the light. Hence it is not surprising, therefore, to find that certain photographic prints made with alizarine have been found to be fugitive, or so fugitive as to destroy the beauty of the tint and the intensity of the shade of colour.

When, therefore, Dr. Monckhoven, in the paper to which I have referred, laid before you prints made by him with pigments which contained alizarine no surprise should have been excited, because in the same paper he furnished you with an explanation of the cause of this fugacity. He informed you that it had been denied that iron and alizarine would produce a red colour, but that this was so provided that the iron was in small quantity. He stated, moreover, that he used or had used such a compound.

Now, I have here a piece of cotton print the design of which is produced by iron and alizarine, the acetate of iron having been first printed on the fabric in two degrees of concentration, and the oxide after due preparation saturated with alizarine in the dye bath. You will perceive, even by this yellow light, that we have two tints—one of violet and the other of black; that is, of violet so intense as to appear black. Judge, then, from these tints—which are those of the natural compound of iron and alizarine, one diluted and the other concentrated—how small a proportion of the iron base Dr. Monckhoven's compound must have contained not to have converted the crimson tint of the pure alizarine into the violet of the pure pigment, and hence its incapacity to resist the action of light.

En passant, I may observe the cotton print before you furnishes us with another proof that in making the statements he did Dr. Monckhoven was in error. Knowing that the notorious permanence of the alizarine compounds on cotton and other fabrics could not be denied, he attributed that permanence to the degree of depth or penetration of the colour into the fabric, thus ignoring one of the axioms of the calico printer, viz., that the topical colour must be of infinite tenuity upon the surface of the fabric to obtain the maximum degree of brilliancy. He effects this in two ways:—First, by the extreme shallowness of the intaglio design upon his engraved copper roller; and, secondly, by thickening his solution of iron or alumina salt with starch, dextrine, or gum, so as to prevent the mordant penetrating the cloth.

You will see in the print before you to what extent this principle has been carried, the light parts of the design lying in an extremely thin plane on the surface, exactly like a pigment print.

We have shown the cause of instability in Dr. Monckhoven's hands. It is possible that the same cause may have operated in the prints made by him from the pigment paper of the Autotype Company, which were also found to be modified by light, and which must have been made with alizarine if, as they allege, all their pigment paper issued since 1876 has contained that colouring matter.

If to render the alizarine compounds permanent a certain quantity of alumina is necessary, and if, when in that quantity, it renders the medium insoluble, how are we to apply this valuable colouring principle so as to render it a proper pigment for the use of the photographer?

I have solved the difficulty completely by using so much alumina only as suffices to develope and maintain the red colour, and then adding another base—a salt of lime or magnesia—in sufficient quantity to render the alizarine not only completely insoluble but also permanent.

Here are numerous specimens of the prints produced from such pigment paper, both in double and single transfer. I will only add that such prints have been tested for stability by Mr. Simpson and others, and stood that test without flinching.

Having given some years of my life to render this beautiful art practical, and its products permanent, I trust I may be pardoned when I say that I read with pain and regret the defence made on a late occasion when the permanence of pigment prints was called in question. It appears to me that, so far from that being a successful defence, it was a mere plea of "guilty" with extenuating circumstances.

It is not thus that carbon or pigment printing should be defended. It needed no such defence when it left Mr. Swan's hands; it was then free from this stigma.

Henceforth I undertake to demonstrate practically that by means of alizarine every tint needed by the photographer can be produced by the pigment printer with a brilliancy equal to any that can be obtained by cochineal, and with the known permanence of madder lake. Let any desired tint be sent to Mr. Sarony, and we pledge ourselves that such tint shall be reproduced in permanent colour.

There is one more point on the practice of pigment printing to which I would allude. After obtaining permanent prints with alizarine, it was found that they were affected by immersion in the alum solution, which, as I have already stated, is a solvent of alizarine; hence, when the finished prints were allowed to remain some time in the alum bath, both a sensible amount of the red colour was dissolved out and an appreciable effect upon the tint produced.

It is a curious fact that while the true alums, the double sulphates of alumina and potash or ammonia, possess this solvent action upon alizarine, the simple sulphate of alumina is quite inert, yet apparently equally efficacious in fixing the gelatine print, so that the latter may with great advantage be substituted for the former wherever alizarine prints are produced. The only drawback I know of to the use of alizarine pigment prints is thus effectually removed, as Mr. Sarony has proved by several months' experience.

J. R. Johnson.

VIGNETTES IN CARBON FOR COLOURING UPON.

The professional photographer has few commissions so difficult to execute or so remunerative when finished as water-colour vignettes with a carbon basis. For very good reasons vignettes have never been popular among carbon workers, and there are very few establishments in the range of my acquaintance where such pictures are ever attempted. It is not that they are not beautiful, nor that the general public do not "take" to them, for they are good in style, and, as far as my own experience goes, they are liked by the public. The fact is they are difficult to execute, from the general want of any detailed instructions such as would enable anyone having a practical knowledge of carbon to produce one without first spoiling a dozen or two as trial pieces, as was my own experience when first I essayed carbon vignettes for painting upon. I did not put the failures down to want of skill, for, having had on one occasion (before I had perfected my manner of working) to get one of the pictures I am speaking of executed by a professional carbon enlarger of the highest standing, I was much disgusted to find my own rejected things actually superior. The margin, instead of being white, was a dull, ashy grey—not the result of purposed tinting, but caused simply by bad workmanship.

This is, as a rule, the cardinal defect of carbon vignettes, though it is not by any means a necessary concomitant of the process. It is to be guarded against by scrupulous attention to cleanliness in all the stages from beginning to end. Filtered water should be invariably used both for mounting and developing. Paper of perfect surface and colour is absolutely necessary. During the printing the utmost care must be used in shielding the tissue from light, and in this connection it will be well to bear in mind the effects of the so-called "continuating action" of light, as a piece of tissue exposed to light for only a few seconds and then kept a day or two before use will print with a sufficiently pronounced tint to spoil any print of the kind about which I am writing.

The next point to consider is the description of paper to select as the support for the picture, and it is here where the photographer generally fails. (It is to be understood that I invariably use the single transfer process for enlarged pictures, as it is no extra trouble to take the negatives reversed, and it saves all the annoyance of double transfer—the bugbear of the occasional worker.) I do not, on any account, recommend the single transfer paper of the Company. It is not artistic to have a smooth surface for large work, and it is most difficult to paint upon, anything approaching to a work of colour being next to impossible. The smooth paper has another disadvantage. Any slight irregularity in the coating of gelatine—such as a slight excess in one part—produces an effect resembling a dirty smear; and, as I have laid so much stress upon the integrity of the whites, it will be seen that this is a very grave fault.

Whenever the picture is to be more than a few inches in size my prints are always done on paper prepared by myself, and with results with which I am quite satisfied. I select a good, hard, handmade paper, and coat it with gelatine and chrome alum, the solution containing about one per cent. of the latter in proportion to the gelatine. As to the amount of gelatine to be dissolved in making the solution for coating the paper it is not possible to give an exact formula, so much depending on the quality of the particular sample in use. The solution should be of such a consistency that it would easily set when cold. It must be most carefully prepared, filtered, and kept free from dust. I need scarcely say that it will be necessary to keep it hot while the paper is being floated upon it, or it will gelatinise and become useless, a further application of heat not being found to answer when once the mass has solidified—a fact well known to experienced workers, but which I may again mention here, my notes being intended more for the tyro than the experienced worker.

A number of sheets of paper should be prepared at once, hung up to dry in a place quite free from dust, and carefully stored away as soon as dry. The surface, then, of the paper is apparently not at all interfered with; and yet, instead of a semi-porous, useless sheet, we have a paper quite impervious, upon which the print can be developed, and which can be selected of any sort most to the fancy of the artist who is going to work upon it. Harding's, Whatman's, Creswick's, or any other paper can be used, so that the finished picture resemble a real water-colour in every way, and does not show its origin by a paper with a smoothness of surface never seen outside the walls of a photographer's studio. I may say that I have found Whatman's paper very difficult to work with, owing to its porosity and tenderness after prolonged soaking in hot water. I have had many pictures spoiled by dropping away from the clips they were suspended by owing to the pulpy state to which they had been reduced.

I must call attention to the fact that the quality of the tissue itself is a prime factor in the case. With a gelatinous support which holds the tissue the whole of the time, and where there is anything in the tissue to stain, such support will absorb it. This quality of tissue, too, can only be ascertained by testing; but it must be remembered that a tissue that may answer admirably for double transfer off a metallic surface, and give no stain, may, in single transfer, stain sufficiently to ruin everything. The Autotype Company's No. 100 is a good tissue; but their engraving black, through having no red or lake tone about it, is less liable than all the papers to the well-known and objectionable pink hue.

I may conclude by saying that when I wish to have plenty of margin I do not use a piece of tissue the whole size of the sheet, but cut a piece of a size somewhat larger than the vignette required, round the corners, and develope in the middle of the sheet. If the above instructions have been attended to the margins of unexposed tissue will be next to invisible, and a little application of a camel's-hair pencil while they are still wet will entirely destroy any trace of tinted film. G. Watmough Webster, F.C.S.

THE ALLEGED FADING OF CARBON PRINTS.

[A communication to the Photographic Society of Great Britain.]

Those practising the so-called carbon process have been from time to time reminded that the use of fugitive pigments will lead to the production of fading prints; and, at the present time, this fact is sufficiently recognised by all concerned.

Dr. Monckhoven now strikes at the foundation of the process, and his remarks would lead us to believe that carbon prints, as at present made, are essentially alterable by the action of light, and he appears to found his case principally on two bases, viz.:—

"Many photographers have already noticed the alteration which takes place when carbon prints have been exposed for a few weeks to the influence of the solar rays. These prints lose their beautiful colour, and become yellowish or of a dingy green.

"A sheet of paper is immersed in bichromate of potash and dried. It is then exposed for an hour to daylight; next washed for an entire hour in boiling water, to be afterwards immersed in an alum solution for several hours; afterwards washed in cold water, and finally hung up to dry.

"According to the before-mentioned theory [that usually received], this paper should contain nothing more than a salt of sesquioxide of chromium, absolutely unalterable by the action of light. But the paper is *yellow*, while the salts of sesquioxide of chromium are *green*. But, moreover, if this paper be exposed to light, a part being covered by a mask of black paper, it undergoes alteration in the course of a few weeks, and a sharp, distinct impression of the mask is brought to view. Now, where the light has acted, the paper is *green*, like all the salts of chromium."

Dr. Monckhoven next sums up his conclusions as follows:—

"This experiment, and many others which we have made in this direction, prove, to our thinking, that neither hot water nor alum *fix* carbon prints. It is true the excess of bichromate is removed by these means; but the chromic salt which has rendered the gelatine insoluble not only *remains*, but this salt itself *undergoes a change by exposure to daylight.*"

With regard to the first statement the general feeling in this country was surprise, as I think very few have noticed the phenomenon alluded to by Dr. Monckhoven, and then only in cases where fugitive pigments have been employed. I can say quite confidently, that a print made with permanent colours, and treated in the usual way, does not undergo the change described by Dr. Monckhoven, as I have frequently had occasion to compare the colours of prints, not only when new, but also after partial masking and exposure to light. This holds good whether the prints have been treated with alum solution or not.

With regard to Dr. Monckhoven's experiment on simply bichromated paper, I can merely say that I have repeated it several times, and find that no yellow colour remains after washing, the washed paper being no longer sensitive to light; and the same holds good in the case of simply gelatinised paper. In order to ensure the absence of mineral impurities, which might vitiate the result, I prepared paper myself, using in some cases cotton and in other cases linen fibre.

The editor of the *Photographic News*, in a leader under date April 5th, points out a possible and, I am inclined to think, a probable clue to the change of tint noticed by Dr. Monckhoven. In this article the writer assumes that Dr. Monckhoven used a single transfer paper containing barium sulphate, and under these circumstances barium chromate* would be formed, giving a light yellow tint to the groundwork under the print, and when this is exposed to light it will naturally change colour, and this despite of long washing or treatment with alum.

I prepared samples of single transfer paper with various proportions of barium sulphate, and found the sensitive yellow tint to be proportionate to the amount of barium sulphate present and to the time the bichromated tissue is allowed to remain on the transfer paper before development. A few hours' exposure to sunlight is sufficient to change this yellow colour to a very light green.

I believe that single transfer paper containing barium sulphate has never been manufactured in this country, the English single transfer paper being merely coated with a thin layer of gelatine made insoluble, and any yellow tint this may take, from the diffusion into it of potassium bichromate, can easily be removed by soaking in cold water.

The thanks of British carbon printers are due to Dr. Monckhoven for having raised a discussion which has opened their eyes to the danger of using single transfer paper from unknown sources, it being obvious that the sending out of expensive enlargements so sensitive to light as to show a change after a few hours' exposure would tend to bring the carbon process into disrepute. Thanks are also due to Mr. Simpson for having indicated the nature of the danger.

As soon as I have time to make the necessary series of experimental tissues, I hope to present to the Society some remarks on that part of Dr. Monckhoven's paper in which he discusses the pigment question in relation to the gelatino-pigment process.

Addendum.

Since the above communication was sent to the Photographic Society of Great Britain, Dr. Monckhoven has published further particulars which necessitate a few remarks.

As a transfer paper containing barium sulphate was not used in Dr. Monckhoven's experiments, it is clear that the yellow colour observed by him does not arise from the presence of this salt in the paper; and the fact that he regards the formation of barium chro-

* Chemists are familiar with many cases in which physical condition and mass determine a reaction, or the reversal of a previous reaction. As an example may be mentioned the well-known lecture experiment in which water and metallic iron are obtained by passing hydrogen over heated oxide of iron, and the inverse phase in which oxide of iron and hydrogen are obtained by passing water vapour over heated metallic iron.

mate, by the action of potassium dichromate on gelatine containing barium sulphate, as "*contrary to the most elementary ideas of chemistry*," indicates that he is not deeply impressed with the dangers attending the use of certain pigments for giving opacity to single transfer paper.

The term "fading," as used in Dr. Monckhoven's original paper, is, according to his last communication, to be read as "change;" but he practically retains his old position by stating that "simple washing of a carbon print, even though it be prolonged for hours, will not eliminate the chromate nor fix the image." This is just the point which is contrary to the experience of others.

In Dr. Monckhoven's last communication he recommends the use of alum, which he repudiated two months ago, and, instead of dipping his prints in a solution of sodium bisulphite, he now adds an insignificantly small quantity of this salt to the alum bath.

Since Dr. Monckhoven's original paper was published several notices have appeared, showing that workers in this country find a moderately long immersion in water, or in water followed by alum solution, to be quite sufficient to fix carbon prints, provided that obvious sources of mischief are avoided.

Thomas Bolas, F.C.S.

NOTES FROM AMERICA.

Prizes for Photographic Results.—The "Lightning Process."—The "Poetry" of Photography.—Retouching.

From the American journals we learn that Mr. H. J. Newton, President of the Photographic Section of the American Institute, has offered six premiums for the best photographs classified as follows:—

First and second premium for portrait negatives of adults, first and second premium for portrait negatives of children, and first and second premiums for landscape and outdoor work. The first premiums will be $30, and the second premiums $20 each. The negatives in all cases are to be untouched. Two prints and the negative are to be enclosed in a sealed package and directed to the Secretary of the Photographic Section of the American Institute, on or before September 5th, 1878. No mention of the name of the competitor is to be contained in the package (or otherwise) with the negatives and prints; but the descriptions of the offerings, with a private mark indicating the names of the competitors, must be enclosed in a sealed envelope and directed to the judges. The premium negatives and prints from them are to become the property of the Section. No prints, however, will be made from the negatives without the consent of the competitor. The premium pictures, with the certificate of the judges, will be exhibited in the art gallery of the fair of the American Institute at the annual exhibition during the coming fall. This competition is restricted to those who reside within twenty-five miles of the city of New York.

The "lightning process," which has of late months been causing much sensation, is now being spoken of rather disparagingly by some who have given it a trial. Among these is a correspondent of the *Philadelphia Photographer*, Mr. I. B. Webster, who, alluding to *three* such rapid processes now being presented to American photographers for a consideration, speaks of one of them in the following manner:—

It is now five weeks since "the license to use" came to hand, which was followed in a very few days by the three bottles, in which was said to be "lightning." And lightning it was, sure enough, for every experiment took the patience out of a man quicker than lightning could begin to do it. As we went along I dotted down results, and up to this week only discouragements prevailed. Do not imagine that efforts were not put forth to make it a success, for I can assure you that the license was obtained and the compounds were purchased in good faith, with an eye singly to business; for photographers need not be told that he who can produce good results with very short exposure has largely the advantage over the one who requires a long one, and to cut a fifteen-second sitting down to one of five seconds, gives opportunities for catching frisky children and nervous adults not to be slighted. Hence the animus for securing this immense accelerator. And that is why there was so great a disappointment during the four weeks' experimenting. I send you two cards taken of the same sitter, without allowing him time to change his position or for the light to change—one taken with the regular formula of the gallery and the other with the "lightning" process; *both were given the same time.* The result shows the "lightning" undertimed.

Mr. Webster followed up these remarks by an *addendum*, in which he describes the contents of the three bottles containing the chemicals upon which the lightning process depends. He says:—

I made mention of the secrets being in bottles, and gave the number of bottles as three, but I failed to give the contents of the bottles. I write now to give that information, hoping I may be in time to have it inserted in the same number as the other. The three bottles contained silver solution forty grains strong, for bath, in one of them; collodion in another; and developer, double strength, in the third. The silver was simply a neutral mixture. The collodion could not have differed much from ours in regular use, as appeared upon trial; but the developer gave every indication of being different from any that we had ever used before. The deposit, however, was of a coarse, sandy nature, which gave to the background anything but a pleasing effect. Take it all in all, from what I have seen of the "lightning negative process," I would not give it house-room, let alone paying twenty dollars for the privilege of using it.

On the other hand, we find in *Anthony's Bulletin* and elsewhere statements made to the effect that certain photographers have found great advantage in using the lightning process, in the bath for which *fused* nitrate of silver is said to be employed. The editor of the *Philadelphia Photographer*, summing up a mass of correspondence upon the subject, says:—

One thing the "lightning" has done that is good, and we give it free credit for it. It has led photographers to try comparatively with it how quickly they can work their own preparations, and to their great surprise they can excel its results in the same time! *Moral:* save your money, and try to develope the full capabilities of what you have by intelligent and diligent experiment, and then, although you won't do it, you will have knowledge and power sufficient to prosecute the regular photographic tramp-process business.

America has produced several poets whose names will never die. Whittier, Dana, Poe, Bryant, Longfellow, and others are among her gifted sons. So, we take the liberty of modestly asserting, is "Hamilton Gordon Wemyss, of S. A.," who in the pages of the *Practical Photographer*, and as "A Tribute to Old Daguerre," pours out his poetic soul in the following lines:—

How dear it is in cranny nook,
Where dust and cobwebs cover,
To study works of sages deep
With ardour of a lover.

In scenes like this old Daguerre
Studied in light and shade
With camera and chemicals;
A tribute shall be paid.

Now raised by a fleeting joy,
Now dashed in deep despair,
Now thrown aside as useless,
Now tried again with care.

Never on earth's philosopher
Did the Fates more darkly frown;
But perseverance and constancy
And Daguerre won renown.

The diamond dug from darkest cave
To blaze in regal crown,
So works of art from one deep thought
Reward and honour found.

He is the father of our art,
So faithful and sublime,
And many sons and relatives
Are following in his line.

Farewell! old Daguerre, farewell
To all his sons of care!
Be constant, just, and true.
Remember the old philosopher, and art will follow you.

It is not for prosaic individuals like ourselves to challenge the lyric utterances of such gifted mortals as the author of the foregoing; our functions as journalists are fulfilled by reproducing this choice *morceau* for the benefit and edification of our readers.

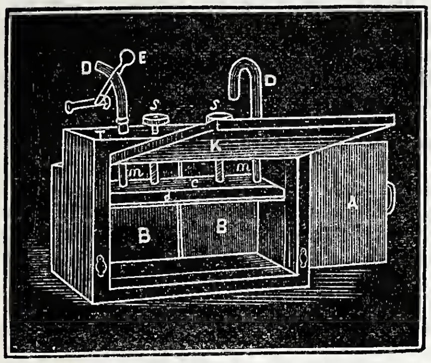
In a more matter of fact style are some observations on retouching, in the same journal, by Mr. J. Leon Pease:—

Much is said of this branch, but not to the point, or so as beginners readily see what is meant. If the following remarks will benefit any one I shall be fully repaid for my trouble in penning them. In the first place, do not go too near the negative; do not go so close as to see each minute spot, but so far away from it that you see the patches these small spots (taken collectively) make. Next have your pencil not very sharp and the point rounded off, so as to give a dull mark, not a sharp one like a scratch. Now commence on the high lights, and work it clean as you go. Work all the high lights first, and by so doing you will keep the modelling of the face perfect. If you are too close to the negative you will lose all this in a short time; practice only will help you to determine when you are at the right distance. Next work the shadows clean, and be very careful not to fill them up entirely—a very common occurrence with retouchers. See that the lights do not stop abruptly, but "blind" into the shadow. Now you must touch lightly. Do not try to fill a spot with one touch, but touch so lightly as to be unable to see each separate mark, but still to see the spot gradually fill up. You must think of what you are doing. No retoucher can do as nice work and think of anything but the face before, as he can by applying himself closely to his work, and knows before he puts his pencil down just what effect the mark will have on the finished print. Just as soon as you try to think of your girl, for instance, and try to retouch at the same time, just so sure will you begin to lose the modelling of the face and leave it only half done. It is this modelling that forms a nice photograph, and the lights and shades that form the expression and likeness. I like to grind my negatives, if I can get a fine surface and not too gritty. Pulverised resin is good for grinding. Do not grind any part but the face, and do not let it overrun on to the background. Experience will teach you how hard a pencil to use, how far away from the negative to get, how hard to touch and when to stop. Most persons do not learn this latter part, but touch till the face is spoiled for a person of any artistic taste. Practice and accustom yourself to study faces and find out the different muscles that form the modelling, and, by so doing, you will aid yourself in keeping the shape of each negative you work on.

ON A PIECE OF APPARATUS EMPLOYED IN RESEARCHES IN PHOTOGRAPHING SPECTRA.

[A communication to the Photographic Society of Great Britain.]

It will be in the recollection of the Society I expressed a hope that I might be able to perform some experiments in atmospheres free from oxygen, and thus to offer a confirmation of the theory I had propounded. There were certain mechanical difficulties in the way which required a little consideration, particularly when, for economy's sake, it was desired to use the same apparatus to experiment with oxidising as well as deoxidising agencies. At last I devised a dark slide which seemed to fulfil the part I required, and got Mr. Meagher to carry out my design. The accompanying sketch shows it:—



The slide is increased in thickness in order that it may be wide enough to hold a glass cell of half-inch width, in which the plate can be placed in solutions, or exposed in an atmosphere as required. A is the front of the slide, which is shown half drawn out, and B is the place in which the cell is placed. C is a wooden slab, on which a layer of india-rubber *d* is placed, as in the ordinary travelling bath tops. Through this top pass two glass tubes *m m*, passing also through the top of the slide T. On to these tubes are fixed india-rubber tubes, D D, which can be closed by clips such as E. The back of the slide is closed by the flap K, to which the usual spring is attached. At each end of the front of the glass cell are glued two little strips of glass, against which the sensitive plate rests, and the latter is pressed against them by means of a platinum or silver spring inserted between the back of the cell and the back of the plate. If a solution is to be experimented with, the solution is first placed in the cell and the plate dropped into position, and the spring inserted. The cell is then placed in the space prepared for it at B, beneath the top *c*, which is carefully screwed down by means of the screws *s s*. The back is then closed, and the slide is ready to place in the camera.

When using gases the plate is placed in position, the top is screwed down, and one of the india-rubber tubes placed in connection with the gas holder or gas generator. For example: in filling the cell with hydrogen one of the india-rubber tubes is connected with a long glass tube filled with calcium chloride, and through this the hydrogen passes after bubbling through a solution of silver nitrate direct from the generator. By keeping up a quick flow of hydrogen the cell is filled in a very short time, and after ten minutes any oxygen remaining must be immeasurable and not enough to vitiate the experiments. In the case of nitrogen the cell is first filled with hydrogen, and then this displaced by the heavier gas.

A very fair vacuum can also be made by attaching one of the tubes to the air-pump or sprengel pump, after stopping the access of air through the other tube by means of a clip. When the vacuum is nearly complete this tube may be connected with a vessel holding the gas; and when the clip is opened it will rush in and fire the cell. After exhausting once more, and refilling the cell with the required gas, exposure may be made in an atmosphere *very* nearly free from oxygen.

The sides and the cell can be cemented with marine glue, in which case a plate may be exposed in any atmosphere or in any solution which is unaffected by marine glue. By cementing the sides with common glue and treacle an arrangement is made by which exposure may be made in such liquids as naphtha, alcohol, &c.

I have communicated the results of experiments already made with this arrangement of slide to the Royal Society, and I was in hopes that I might have been able to have given this Society a fuller description of them than I have in the paper sent to Burlington House; but unfortunately, owing to circumstances, my communication will not be read till the 14th instant. Owing to this my mouth is closed till after that time, and I can only say that the theories which I have ventured to promulgate seem to be fully confirmed, and that the experiments point to conclusions which, if correct, cannot fail to be valuable to the practical as well as to the theoretical photographer.

In the interval which will elapse between this last meeting of this session and the first of our next, I hope, if nothing unforeseen occur, to be able to give the results of new explorations in fields akin to that I have already travelled over.

W. de W. Abney, F.R.S.,
Capt. R.E.

FOREIGN NOTES AND NEWS.

Sigson on Companion Pictures.—The *Wochenblatt* on Obernetter's Reversed Negative Process.

In the *Mittheilungen* Herr Sigson says that, being only able to take portraits at one end of his studio, he used to feel annoyed at not being able to get proper companion pictures to hang (say) on each side of the fireplace, as both pictures would look the same way. He, however, got over the difficulty by stripping off one of the negatives and printing it with the wrong side uppermost. His *modus operandi* is as follows:—The negative to be drawn off is retouched and varnished (Herr Sigson uses Schering's varnish much diluted with alcohol), and is then laid in water. As soon as the edges of the film begin to soften the negative should be taken out of the water and left to drip, and a piece of common writing paper, which had previously been floated upon water, should be laid upon the negative and the superfluous water pressed out. The corner of the film should then be raised from the glass with a knife and drawn off along with the paper. If on raising up the corner the film should crackle, that is a proof that it is not sufficiently softened, and the whole, including the paper, should be returned to the vessel of water for a short time. Herr Sigson found that with the varnish he used the time the negative required to soak in the water varied from one and two hours with a thin varnish and clean plate to a whole day when the varnish was extremely thin, and sometimes it was even necessary to revarnish. When the varnish is glassy half an hour is generally sufficient to soften it, and care must be taken not to let it soak too long, or it will cause rents in the film. When the film has been drawn off another piece of writing paper is moistened and laid upon a piece of glass, and the film is then laid upon it with the first paper uppermost; the whole is then pressed together and the first paper removed. A thin solution of gum arabic is now carried over a clean plate, and the same is passed over the upper side of the film, which is then laid upon the plate. The excess of gum is discharged by pressure and the paper removed, leaving a reversed negative. The rest of Herr Sigson's paper is occupied with directions for combination printing.

With regard to Obernetter's reversed negative process the *Photographisches Wochenblatt* says:—

"Repeated careful experiments have convinced us that the prescribed proportion of silver (namely, five grammes to 400 c. c. raw collodion) is insufficient. The film got with it is too thin. We added eight grammes of nitrate of silver and were not then satisfied, and only when we used ten grammes could we get a film with any body. Further: it is important to keep this silver collodion in the dark, as the light affects it. Then it seemed that the nitrate of silver was far from being as equally distributed in the collodion as the bromine and iodine salts, the first plates being really cloud negatives with more or less opaque spots. We have, therefore, tried shaking up the silver collodion when preparing it with our whole strength, and then letting it stand to settle. This operation repeated for several days at length produced the desired result.

"According to our observations the potassic bromide bath is the one best suited for dry plates. We take—

Raw collodion	1 pound,
Nitrate of silver	10 to 12 grammes,

and sensitise in a bath of—

Distilled water	1 kilogramme.
Bromide of potassium	120 grammes.

Then we rinse both sides of the plate carefully with common water, let it drip, and then coat it twice with a ten-per-cent. tannin solution. In spite of the comparative insensibility of bromide of silver films coated with bromide of potassium solution we should by no means advise anyone to wash them by ordinary daylight, as that tends to render them insensitive and foggy.

"We develope as follows:—When the plate has been exposed we pour over it the ordinary mixture of water and alcohol and then wash on the tannin solution, though it should be said that Obernetter's way of first coating the plate with a weak solution of nitrate of silver gives still better results. We coat the plate then with a three-per-cent. silver solution, followed by a one to fifty solution of pyrogallic acid in water with a small addition of alcohol as developer, and get the best results. We also tried the alkaline developer and found it possessed no advantage; it was also very disagreeable to work with. Damry's developer also gave very good plates, and the developer he recommends proved usable.

"We found Obernetter's dry plates (developed with pyrogallic acid) specially worthy of recommendation for enlargements, as they reproduced all the details even in the shadows, without being too dense for artificial light—that of the sciopticon, for instance—to pass through them."

PARIS EXHIBITION.

COMPLETION OF THE LIST OF JURORS IN CLASS XII.

UNITED STATES.—Henry C. White, Esq., Honorary Commissioner, U.S., to the Paris Exposition.

Great Britain and Ireland.—William England, Esq., 7, St. James's-square, Notting-hill, London, W.

By the above appointments the International Jury for Class XII. is thus complete.

M. Davanne was elected President by all the members except one, who voted for M. Adolphe Martin.

M. Levitsky, the juror for Russia, was unanimously elected Vice-President.

M. Adolphe Martin was elected Honorary Secretary, but owing to his numerous engagements he requested that he should be excused, which was agreed to with regret. A further election was then proceeded with. Herr Luckhardt, Austrian juror, received four votes and the Comte d'Heliand three votes; consequently Herr Luckhardt was named Honorary Secretary.

The above elections were adjourned for a day in the hope of the English juror being able to arrive, to whom the Prince of Wales paid the signal honour of himself commanding his personal attendance in Paris, the telegram notifying Mr. England's appointment.

The jury is in active operation. W. HARRISON.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 27	Liverpool Amateur	Free Library, William Brown-st.
,, 27	Oldham	Hare and Hounds, Yorkshire-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

WE now give the conclusion of the report of the meeting of the above Society, a portion of which was given at page 283 in our last number. The papers read will be found in other pages of the current issue. We are again indebted to the Society's official organ for the report of the observations made by Mr. J. R. Sawyer, Mr. W. S. Bird, Mr. J. R. Johnson, and others, on the papers read at the recent meeting.

Mr. T. J. PEARSALL said there was one remark he wished to make in regard to Mr. Bolas's paper. Mr. Bolas spoke as if the whole question turned upon the presence of the baryta salt, and, though chromate of lime was mentioned, not one word was said as to its probable influence. Some years ago, in the course of some experiments in connection with chromic acid, he had had this substance before him; and though he did not pay much attention to the colours, which were neither beautiful nor interesting, he yet thought it was possible that the "greening" or changing of the tint might be due to the combination of the common salts of lime with chromic acid as well as to the salts of baryta.

The PRESIDENT asked whether Mr. Sawyer would say a few words on the subject of the paper.

Mr. J. R. SAWYER: We have had this evening a somewhat exhaustive paper upon the subject of alizarine, interesting to some extent, although not, I fear, practically interesting in a photographic point of view. I take it the addresses that are delivered here, as a rule, have been such as would lead to some possible modification or improvement in the practice of photography. Mr. Johnson has given us a history of alizarine, an account of its uses in dyeing, of certain modes of preparation, but he has at the same time taken the opportunity of reflecting somewhat severely upon the company of which I am a member, and also upon the learned doctor whose address the Society heard read some little time since. I must say, sir, I feel somewhat diffident in approaching this matter, because I feel it is difficult for me to make the few remarks I should like to make without drawing upon myself the imputation of speaking in a "shoppy" or personal sense.

The PRESIDENT: I will stop you, Mr. Sawyer, when you are approaching that ground.

Mr. SAWYER: I hope that no charge of that kind will be laid against me; but when, in the paper just read to us tonight, it is recommended that we should go for our pigments to a certain individual who will undertake to make them of any shade we may require, I venture to say——

The PRESIDENT: Is there such a recommendation in the paper?

Mr. SAWYER: Certainly; that portion relative to Mr. Sarony.

Mr. J. R. JOHNSON: I simply mentioned that as a proof of the facts I had stated.

The PRESIDENT: The paper says—"If such a tint be sent to Mr. Sarony we pledge ourselves such tint shall be reproduced in permanent colours."

Mr. SAWYER: That is the part to which I refer. Sir, I shall not venture to suggest any proceeding of the kind with regard to ourselves. Well, Mr. Johnson has made something like a complaint against us that we have allowed the perfect process of Mr. Swan to become, in the hands of the Autotype Company, deteriorated. I understood Mr. Johnson to say that Mr. Swan left his process perfect, and that afterwards we——

Mr. JOHNSON: No; that is not so.

Mr. SAWYER: You say that there is now a stigma upon the permanency of carbon prints.

Mr. JOHNSON: I said that Mr. Swan produced no fugitive prints. No fugitive pictures were ever prepared by Mr. Swan; that is all I wish to place upon record. My point, if I am not out of order——

The PRESIDENT: I think you are a little out of order. I must ask Mr. Sawyer to go on, if you please.

Mr. SAWYER: What Mr. Johnson said bore this reference to my mind—that Mr. Swan left this pigment process perfect, and that by our *Manual* of 1876 we confessed to the use, in certain cases, of what has been styled fugitive pigments. I will not discuss what are fugitive pigments. It may be, that because you have a modicum of cochineal a print may be called fugitive, but not in any case such as to be absolutely discernible. As I have before said, what is there on earth that is *not* fugitive? The water colours which are now hanging on those walls in ten years' time will be changed and faded in their tints. I do not say that this change is a change for the worse, as they will have but got mellowed by time, and have got the impress which time alone can give. I do not, of course, compare photography to water colours, but I wish to point out that a great deal has been made, for certain purposes, of this term "fugitive," when in no sense has the term been applicable to carbon prints. But I will let that pass. We said, in the *Manual* of 1876, that in order to obtain brilliant tones it had been necessary to employ certain colours which were not absolutely permanent. Mr. Johnson wishes you to infer that during the time he was with the Autotype Company he used a solution or a preparation of alizarine which was perfectly suitable for double transfer prints.

Mr. JOHNSON: I said in 1872.

Mr. SAWYER: And the gist of his remarks is that from 1872 to 1876 we had ignored this valuable discovery—had put it on one side—and, for certain purposes, had taken and used fugitive colours.

The PRESIDENT remarked that rather dangerous ground was being approached.

Mr. SAWYER: I will endeavour to avoid it. It is said that this preparation of alizarine was not suitable for single transfers because it stained the transfer paper. As most of the work done by the company, both in Mr. Johnson's time and since, is single transfer, it is absolutely necessary that the colour employed should not stain the single transfer paper. But the allegation is that colour was prepared as to be so suitable. There are two double transfer processes—that of Mr. Johnson and that of M. Lambert. Mr. Johnson's did not find favour because it did not give that brilliancy of surface desired by photographers, and the transfer was replaced by development upon wet collodion. But up to 1876 it was not possible to develope prints containing this preparation of alizarine in combination upon collodion, because it stained the latter to such an extent that it was absolutely useless. As photographers must have this brilliancy it was to meet this difficulty that we introduced a small quantity of what has been called fugitive colour; whether it is fugitive or not the results must show. All that I can say is that we have had pictures hanging for a lengthened period in our rooms exposed to a strong light. There are pictures in every part of England; the Society have had a number in this room, and none have ever shown signs of fading. He (Mr. Sawyer) then referred to the history of the discovery of the new forms of suitable alizarine colouring matter for introduction into the carbon tissue, and continued:—Our efforts, as members of the company, have always been most earnestly in the direction of permanency. Thousands of experiments have been made, we have got together the best chemical assistance we could procure, and when a paper is read before you containing the matter which the latter part of this one contains, I felt that, at the risk of being a little out of order, I had a right to defend the course of action which has been rather severely commented upon by the author. Mr. Johnson, in the process which he has patented, makes a point of using a salt of lime in conjunction with alizarine; but in my practice (carried out with very great care) this salt has not had the slightest effect one way or the other, except to increase the bulk of the alizarine. We keep our preparation of alizarine a secret, and we honestly say that we do not come here to reveal what is a source of commercial profit, and by which we live. Mr. Johnson says that in his experience alizarine prints are affected by immersion in the alum solution. My experience does not bear this out. We have used alizarine for single transfer without any stain, and we have found it to mix perfectly. I am sorry to come before the Society in this light, and I think it would have been better if Mr. Johnson had confined himself to the history of his own invention, and to have left Dr. Monckhoven and the Autotype Company to that oblivion which would have suited them.

Mr. S. FRY thought that any fears that might be entertained as to the permanency of carbon prints were quite unfounded. He (Mr. Fry) could not help thinking, however, that Dr. Monckhoven's paper was very injudicious; at the same time he did not believe he intended to fix anything like a stigma on the carbon process as it is worked in the tissue supplied to the whole world. The statements he made were not such as could be fully borne out by the facts.

Mr. W. S. BIRD: I am sorry a discussion on carbon printing has taken a form which is scarcely suitable for a learned society. Mr. Johnson's paper is a clever and interesting one; but certainly he has indulged in reflections of a more or less personal character. I may, perhaps, be allowed to correct Mr. Johnson in a matter of history. He says that in 1872 he succeeded in producing alizarine suitable for use in pigment prints which, with double transfer, answered perfectly. I think that here Mr. Johnson must be slightly in error. Mr. J. A. Spencer was associated with Mr. Johnson in these experiments, and Mr. Spencer—an able and careful chemist—did not know that alizarine could be so used. The staining of the tissue was a difficulty not then overcome. Mr. Johnson was associated with us at that time as one of the company, and he never said to me that he had a method by which alizarine could be used. There is, therefore, in his mind a little error as to dates. We had tried alizarine without effect, and it is only under new combinations that it has become at all practicable. Dr. Monckhoven suspected its permanency, and, as it is a matter of great importance that carbon prints should be without the slightest suspicion of change, any communication which could assist that result should be thoroughly welcome. At the same time I must say, with regard to Dr. Monckhoven's statements, that we deny that his experiments were made with the Autotype Company's tissue. Here are specimens said to be on this tissue which, I am absolutely certain, were never made on our tissue at all. We deny the fact, and it is unfair to publish experiments which are of a one-sided character. I believe Dr. Monckhoven to be under a mistake with regard to his paper, and to be very rash in regard to his facts.

The President observed that, without entering into the merits of the controversy, he might point out that when Mr. Johnson said that in 1870 the Autotype Company produced prints which did not fade, and that now a certain stigma rested upon their work, a disagreeable inference could not fail to be drawn. He was sorry the statement had been read, but having been read he was obliged, as a matter of justice, to allow Mr. Sawyer an opportunity to reply. It was well known what the Autotype Company had done. Not very long since a large number of prints were exhibited by the Society which had been produced some six or seven, or fewer, years since, and, to his mind, there were no signs of fading. Dr. Monckhoven stated that he had made experiments with the company's tissue, but that had been denied by Mr. Bird. It was painful to him (the President) that a difference of this kind had arisen, but he trusted that it would be the last time, and that all would endeavour to work for one common object—the improvement and development of photography.

Mr. Johnson, in reply, said: As regards the importance of the subject I need simply refer you to Mr. Sawyer's remarks. He tells you he has made thousands of experiments upon colouring matters to arrive at a permanent compound. At the same time, having myself, I believe, succeeded in forming such a compound, I think it is my duty to call your attention to the result. It is true that the matter has been put on record as a patent, but that patent will be manufactured and supplied at a reasonable price to the public; and, as every one can now make the tissue for himself, the question of permanent colour comes home to every individual present. As to the question raised by Mr. Sawyer in respect to the double transfer, it is a matter which can be very easily tried. I pledge myself to show him—if Mr. Sawyer will allow me to state what it is. May I say what is the formula?

Mr. Sawyer: Mr. Johnson is perfectly at liberty to state what the formula is, for up to this time it has not come down to the company.

Mr. Johnson: On the contrary, you have the solution.

Mr. Sawyer: It is simply called the red solution, and nothing more.

Mr. Johnson, in reply, was understood to say that by using tartrate of potash the ordinary effect of the insolubility of gelatine of alumina was no longer obtained. With madder red in combination with alumina for a basis he pledged himself to produce perfectly permanent pigments, only he admitted that they could not be used with single transfer. It also stained collodion, but in certain methods this might be obviated. In conclusion Mr. Johnson said he considered he was justified in claiming that he had settled the formula for double transfer in 1872, and that, having seen in the fifth edition of the Autotype Company's *Manual* a statement that fugitive materials were employed, he thought it was his duty to place on record his share in the matter.

The President, in closing the discussion, alluded to a promise made by Mr. Sawyer, that a print, one-half of which was to be covered, should be exposed for some time to light, and hoped that the promise would be fulfilled.

Correspondence.

SENSITISED GELATINE SUBSTRATUM.

To the Editors.

Gentlemen,—I will add another idea to that thrown out last week in regard to a gelatine substratum—an idea which occurred to me some three years ago, when considering by what means great intensity could be secured in the negative, more especially in reference to dry plates and to the gelatine film, which was scarcely so well known then as now for its capabilities in the direction of intensity. The idea may have occurred to me, as many others do now, from something I had read in The British Journal of Photography. At anyrate, it has been treated in the Journal since that time by other correspondents, and, as usual, ably experimented and commented upon by the Editors. Still the experiment, as far as I recollect, was not made in the precise form in which I had proposed it to myself. I have made many experiments in the intervals I have since been able to devote to such subjects; but this has been kept in reserve, and, as some time may elapse before I can return to the matter, I venture to suggest it now in case anyone else should think it worth while to repeat my experiment.

My idea, then, was to coat the plate first with sensitive gelatine emulsion and afterwards with a washed collodion emulsion. I forget now whether, in the experiments afterwards recorded, this was done in a reverse order, or whether only collodion films were used; but the impression remained on my mind that my own experiment was left untouched. The importance of placing the sensitised gelatine film first arose in my mind from the following considerations:—The rays of light having to traverse the upper film, in which they would be to a considerable extent absorbed before reaching the under one, could only act more feebly there; but the greater readiness with which the more sensitive gelatine film would respond to this more feeble action might permit an effect to be produced as great as that in the upper film, and thus the image developed right through both films might become very intense.

For my own part I prefer to print, not from a *dense*, but from an *intense*, negative. The relative sensitiveness of the two films as I proposed to use them would have been as seven or even as ten to one. The collodion film, therefore, even if equally exposed, could only receive the very faintest impression by the time the gelatine would be fully impressed; and, if placed underneath, would absolutely have no chance. On the other hand, with the gelatine film underneath, even if it should, owing to its much greater sensitiveness, be impressed in a greater ratio than the other, would only come under the action of the developer after it had penetrated the collodion film, and thus something more like a simultaneous development would be effected.

One more consideration may be added here—although that could not enter into my speculations at the time, having been only revealed at a later period through the able researches of Captain Abney—namely, that the impressed film underneath would aid the development of an image in that above, although the latter had not been previously impressed. I am not sure how far the same fact was established with regard to an impressed film underneath. But there is still one point with reference to a gelatine film above instead of below:—The developing fluid, having to penetrate the gelatine completely before it could reach the other, and to be kept on still some time, I should fear a solution of the gelatine would have begun before the action could be complete beneath.

I do not know how far the experiment—which I still hope some day to make—would, if successful, be available for any particular purpose; but I may remark that, having made recently, at Gibraltar, somewhat systematic experiments with various kinds of dry plates—gelatine emulsion and collodion washed and unwashed emulsions—I found no difficulty in getting a large amount of intensity. Only one kind—a commercial sample—failed me, but I think there was something else wrong with them.

It may, perhaps, be interesting, in regard to the question of dry plates *versus* wet, to notice that I was wishing to do something towards the solution of this question; but was not quite able to work both together as I intended. The wet-plate work was done a year earlier, under as nearly as possible the same conditions. I believe both may be taken as a fair average of what wet- and dry-plate work are each capable of producing. I submitted the whole of the negatives to a more experienced photographer, who pronounced, without hesitation, in favour of the wet plates. The gelatine plates, he thought, came nearer to the wet than the others. The wet plates were not intensified with pyro. and silver, but for some of them silver was added to the iron developer. The commercial samples of dry plates, except the one (which also promised admirably at first), were all of great excellence. When not experimenting, I would undertake to make from every one of them a good negative. An unwashed emulsion, which I prepared from known formulæ, gave me negatives equal to any of the former; but I could not equally rely on these, owing to a want of convenience for properly preparing them.—I am, yours, &c., Wm. Washam.

Eastbourne, June 17, 1878.

A PERVERSE PRINTING BATH.

To the Editors.

Gentlemen,—We are all pretty familiar with the vagaries of the negative bath, and I have hitherto considered myself fortunate in being spared much of the trouble of which I hear others complain in that direction. I have recently, however, had to confess myself beaten by my printing bath, which is usually supposed to be so easily managed and kept in order.

This is how it occurred, and perhaps you may be able to assist me to a solution of the mystery:—A few months ago I came across a formula in one of your Almanacs for the preparation of paper that would keep. I have not the exact formula at hand now, but it consisted in acidifying the bath with citric acid and subsequently neutralising with ammonia. I don't know what went wrong exactly, but, after "dodging" it alter.

nately with acid and ammonia, I found that to obtain a clear solution it must be either very acid or very alkaline, neither of which conditions appears to me desirable. At length in disgust I threw it down with carbonate of soda, and, after washing, proceeded to redissolve the carbonate in dilute nitric acid. I have always been under the impression (and the idea has been fostered by what you yourselves, as well as others, have written on the subject) that carbonate of silver and free nitric acid cannot possibly exist together—that one, at least, must disappear. Imagine my surprise, then, upon testing the solution, which still contained some undissolved carbonate, to find it extremely acid. I boiled it to drive off any traces of carbonic acid gas which *might* possibly remain, but the corrosive fumes bore ample testimony to the presence, in large quantity, of free nitric acid.

I have that bath yet, and calculate that I should have saved by the transaction if I had sent it down the sink before I commenced messing with it. If anybody else tries to persuade you or your readers to go in for citrate of ammonia, take my advice, and—don't. In future, the reply received by all such advisers will be from—Yours, &c.,

June 18, 1878. "NOT GOOD ENOUGH."

[The precipitate which remained after the solution had acquired acid properties was not carbonate, but *citrate*, of silver. The latter appears to be somewhat erratic in its behaviour; it is more or less soluble in neutral or alkaline solutions of silver, but neither in nitric acid itself or in solutions containing it.—EDS.]

ANSWERS TO CORRESPONDENTS.

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

EXCHANGES.—In our next.

CONGRESS.—It is worth trying, but we have some doubt of the result.

F. R. J.—It is the *back lenses* of the portrait combination that determine the flatness of the field.

DELTA.—Collodion emulsion may be applied to paper; but, in developing an image obtained upon this basis, care must be taken that no stains are formed.

LANCASTERIAN.—The colour of the paper is decidedly bad. Let it either possess a delicate rose tint or, otherwise, be of a deep cream colour. The mount may with advantage be a deep drab.

ALEX. THOMSON.—The finest collection of photographs of wild animals of which we are aware is that of Mr. F. York, of Lancaster-road, Notting-hill, W. We presume that you can obtain a list of the subjects on application.

J. A. (Beverley).—There is no difficulty in procuring formic acid—at least in London. Perhaps the true cause of its not having been "universally adopted" is that the claims made in its favour have yet to be established.

THOS. FOWLER.—The mottled appearance of the prints is due to the weakness of the hypo. fixing bath. The yellow stains are sulphide of silver. By employing a fixing bath of a sufficient degree of strength both of these annoyances will be got rid of.

J. H. P.—The *Silver Sunbeam* was published by Messrs. Longmans and Co., but it will be almost impossible for you to obtain a copy now. By calling at our office, about a week hence, you may have the privilege of examining the most perfect copy of the work that we have seen.

W. H. R.—Although lampblack and vegetable black are so nearly similar in colour when mixed up with varnish, there is a great difference between them when dry. If the proportions of black and of varnish have been properly adjusted both will dry quite dead, but one will be grey in comparison with the other.

G. B. SANDS.—A stage micrometer may be made very easily by means of photography; but it is absolutely necessary that it be used only with the lowest powers. If a high power be employed it will show the lines in a very blurred condition, and the atoms of silver which compose such lines will also be plainly visible.

T. T. S.—We have never disputed the admirable quality of the results obtained by the collodio-albumen process; but you are surely not prepared to place it in competition with some of the modern processes as regards convenience and ease of manipulation. After all has been said, too, in favour of its results, the very finest dry plate pictures we ever saw were produced by an emulsion process.

BOWSCAR.—1. Of the three lenses mentioned in your list for the purposes of enlarging, the half-plate will be found most suitable, the length of exposure increasing with the length of focus.—2. Our correspondent asks where he can find M. Poitevin's formula for the perchloride of iron and tartaric mixture mentioned by him for the equalising of intensity in negatives. Perhaps some reader will be able to supply the information.

AMATEUR.—Teak has been preferred for cameras by some experts in wood, but mahogany must be considered as holding the sway; we therefore advise you to make use of this kind of wood for your camera. Mahogany also answers well for making baths; but in this latter application the pores of the wood must be filled by either paraffine or wax, or by a mixture of both. It has been proved that a bath-holder so prepared exercises no injurious action upon the nitrate of silver solution.

C. B. A.—The nine-inch lens will give a picture of *Arthur's Seat* which will convey to the spectator a truer idea of this towering eminence than the six-inch lens. The reason of this is, that the lens having the shorter focus introduces into the picture objects in the immediate foreground which, from their comparative magnitude, dwarf the larger object. When a wide-angle lens is employed for landscape work it is a safe expedient to remove a large portion of the foreground.

W. L. A.—Bromide of potassium is not sufficiently soluble for the purpose, though admirably adapted to gelatine emulsion. Unlike the ammonium salt, its solubility in alcohol is not increased in the presence of cadmium bromide. Your supposition that the increased sensitiveness of gelatine emulsion "may be" due to the employment of potassium bromide will scarcely hold good when some of the most rapid formulæ published contain the cadmium and ammonium salts.

NOIRCEAU.—Drop-black is superior to lampblack, *i.e*, the ordinary lampblack of the oil-shops, which appears to consist of little else but ordinary soot. Moisten the black with methylated spirit, having previously rubbed it down to a fine powder in a mortar, and then stir in gradually ordinary spirit varnish until, when dried by heat upon a piece of brass, the powder will bear moderate friction with the finger. The secret lies in the wetting with alcohol previous to the addition of the varnish.

GEO. C. COOKE.—In the photographing of granulated paper, so as to obtain a negative that will print the granulations properly, the whole secret consists in directing a very oblique light upon the paper. The more oblique and intense the light the more decided will be the definition of these granules; and, on the other hand, the more directly the light falls upon the paper the less will its surface texture show in the negative. For this reason, when copying a paper photograph it should be illuminated by a diffused front light, this being the condition under which the finest copy will be obtained.

J. H. L.—Of the two forms of lime light burner of which you have sent diagrams (both of which are defective), that containing the wire gauze is the better one; but it will require more pressure on the bags to overcome the resistance caused by the wire gauze in the burners.—2. Yes.—3. Water-colour flat tints can be laid evenly if you first coat the glass with weak albumen, and dry. To lay oil colour requires nothing but practice. We published, in our columns, a few months back, a very exhaustive treatise, by Mr. Ross, on the painting of magic lantern slides, to which we must refer our correspondent for full information on this subject.

OBLIGED READER.—By dabbing the prints with a large sponge and lukewarm water the hyposulphite of soda may be thoroughly removed from them in a quarter of an hour. We have seen an apparatus, whose construction was based upon the knowledge of this fact, by which long washing of prints was obviated, the whole operation being completed in less than the time we have mentioned; but in a large establishment in which several hundreds, if not thousands, of prints have to be washed at a time the most practicable way of proceeding is to place them in a trough through which a stream of water flows in such a manner as to keep the prints in a state of constant, although gentle, agitation.

FERRUM.—1. We have been unable to recognise any of the advantages claimed for salicylic acid in connection with iron. Theoretically, it would appear strange that a substance itself possessing reducing powers should act as a restrainer or retarder of reduction, and practically salicylic acid is found wholly incapable, *per se*, of exercising this function. Its extremely feeble solubility in water—at least at ordinary temperatures—limits its application; and by no variation in the proportions of iron and acid have we been able to secure a solution which does not rapidly "fog" an unexposed plate.—2. Both the acetate and nitrate of iron have given good results in the development of wet plates; but there can be no doubt that, for general purposes, ferrous sulphate is *the* best of all the iron salts.

RECEIVED.—J. Solomon; S. Rouch; G. Mason; J. Nicol, Ph.D.; and *Autotype Notes.*

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

For the two Weeks ending June 19, 1878.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

June.	Bar.	Wind.	Wet Bulb.	Dry Bulb.	Max. Tem.	Min. Tem.	Remarks
6	30·24	W	51	53	71	49	Cloudy
7	30·19	SW	57	61	70	51	Cloudy
8	29·87	S	59	66	73	55	Cloudy
10	29·75	WSW	54	58	70	52	Cloudy
11	29·65	SW	57	57	64	52	Dull
12	29·62	SW	53	59	65	50	Cloudy
13	29·88	W	55	59	71	52	Cloudy
14	29·90	E	49	52	58	49	Dull
15	29·90	NE	48	54	61	46	Cloudy
17	29·84	NE	52	55	66	51	Dull
18	29·91	W	55	61	69	53	Hazy
19	29·99	NW	56	61	66	52	Hazy

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THE BRITISH
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TRANSPARENCIES FOR WINDOW ORNAMENTATION.

Photographers being sometimes called upon to provide transparencies for the ornamentation of glass doors or windows in domestic architecture, a few remarks on this application of the results of our art-science may be useful; but such observations as we have to make must be considered as merely suggestive, and not by any means as exhaustive.

There are certain principles which we would lay down as a basis for this application of our art, the first of these being that the window or door pane to be ornamented must have its transparency destroyed, by which is meant that it must be so treated as to render it impossible to be seen through. The general function of an ornamented window is to prevent an unpleasant or inartistic scene outside from being perceived by those inside; and it is well known to some of our readers that one of the largest and finest windows of the kind we are describing intercepts and blocks out by such artistic means the view of a coachhouse and stable with their accompanying stable-yard. Those whom we have captivated by this choice specimen of the united work of the photographer and the painter had no conception of the fact that as a background to this work of art, although unseen by the spectator, the unpleasant erections named stand at a distance of thirty feet. A second principle that should be recognised is that of having the picture of a vignetted, sketchy character. The tone, unless when the nature of the subject otherwise demands it, should be warm and "sunshiny."

There are three mediums which may be made use of as the bases upon which to print the transparency, namely, paper, opal, and ground glass. It is very fortunate that the first is at once the best, the easiest, the cheapest, and most convenient of these various bases. But if the image is to be formed upon it by silver printing a method quite different from that employed in ordinary practice must be made use of; for, whereas in an ordinary photograph it is essential that the image be on the surface, it is here one of the conditions of success that it be sunk into and distributed through the entire substance of the paper. The difference between these two conditions may be easily exemplified by dividing a sensitive sheet of albumenised paper into two, and printing one of them with the albumen surface, and the other with the back of the paper, next to the negative, the printing being carried out in the second case until the image is clearly visible upon the albumen. Now examine the two prints as transparencies, and it will be seen how much more vigorous is the one than the other. To prepare paper for transparency printing it should be immersed in and not merely floated upon the silver bath. Several very fine window transparencies we have seen are made upon plain salted paper.

There does not appear to be any special condition required in the selection of paper for this purpose beyond this—that it must be wove and not wire-laid paper. Plain, unalbumenised Saxe or Rives papers answer admirably, and the only preparation required is a primary immersion in a ten-grain solution of chloride of sodium, followed, after drying, by immersion in a thirty- or forty-grain solution of nitrate of silver. The printing must be carried to a great degree of depth to allow of the reduction that will ensue upon the fixing; for the gold toning will be so slight as not to interpose any great obstacle to the solvent action of the hyposulphite of soda upon the silver of which the print is composed. It will be borne in mind that what we are now aiming at is the production of a very deep, warm-coloured transparency.

This having been obtained, the next step is to render it transparent and attach it to the window pane. It will be understood that the degree of transparency to which the print will be amenable falls far short of that by which objects at a distance can be perceived through the pictorially-ornamented glass; in short, it is the transparence or, more correctly, the *translucence* of ground glass or of pot-opal that is required. To such end provide a rather weak solution of Canada balsam in benzole, and apply this repeatedly to the picture until the transparency acquired by the first touch of the varnish brush, and which disappears upon the evaporation of the benzole, becomes permanent. Three or four applications of the varnish may be required ere this be attained.

The glass plate, having been cleaned, is coated with the same varnish, which, for this purpose, should be strengthened by the addition of more balsam; and a similar coating having been given to that side of the print that is to be placed in contact with it, an attachment is made commencing at the foot, and keeping the upper portion of the print curved outwards so as to admit of a continuous layer of the liquid varnish remaining at the point of junction between the paper and the glass, until the two are brought into contact up to the top. This ensures the avoidance of air-bubbles, which, although they may be rubbed out, are yet better avoided. When the whole has become thoroughly dry the services of the artist may be utilised to examine the whole critically, and complete the effect by imparting a little more depth here and there as may appear necessary. In the manner now described have been produced a series of the finest window transparencies we have yet seen.

A friend of ours, having a cultivated photographic taste, became the fortunate possessor of a yacht in which were a pair of folding doors with ground plate-glass panes of large dimensions, having a very handsome border, embodying a floral design surrounding each. The centre was adorned with the arms of a previous possessor, for whom the vessel had been constructed. Both the ornate border and the arms were deeply engraved by means of fluoric acid, which, when applied as a fluid, causes the surface acted upon to be of a glossy, smooth texture compared with the matt surface that results from effecting the etching or engraving by fluoric acid *gas*. What was required was the means of removing the arms, leaving the *entourage* intact. This has been effectively accomplished by covering the former with a photographic paper transparency prepared as we have described, with the additional element of colours, the transparent oil colours employed having been those found most effective in the colouring of lantern slides, namely, Prussian blue, gamboge, burnt and raw sienna, with madder and carmine for the reds. By means of these colours every combination of tint may be made. The pictures prepared in this manner possess a very fine appearance, no trace of the still existing arms being visible. It will be understood that although we have described in detail the method of printing by silver, pigmented tissue may be made use of with equal facility and with the further advantage of permanence.

ON THE EFFECT OF PRECIPITATION UPON COLLODION AND EMULSIONS.

In the communication of M. Ch. Audra, read before the last meeting of the Photographic Society of France, and in the discussion which ensued, we notice one or two points in connection with the properties of washed emulsions which do not coincide with our own or the general experience of emulsion workers on this side of the channel. We allude, of course, to the want of keeping qualities observed by M. Audra in connection with the finished emulsion—not as an accidental or occasional circumstance, but as the general characteristic of the emulsions he employs. In so short a time as six weeks after re-solution he finds the preparation completely useless; but the exceptional case of an emulsion retaining its working properties for twelve months has excited his astonishment, and has caused him to draw the valuable deduction that a washed emulsion may be made to keep indefinitely.

As regards the latter term its vagueness prevents our fully endorsing M. Audra's deduction, but this much we can with safety assert—that for one, two, or three years, or even longer, it is not only possible but easy to keep an emulsion in the state of solution and in full working order; indeed in this country the exceptional cases are those in which an originally good emulsion fails to retain its working qualities (to use the common expression) "indefinitely." Where, then, is the cause of this difference in behaviour?

Our reply to this question will, we fear, cause a shock to M. Audra, and, indeed, to all his French *confrères*, for it amounts to nothing less than an impeachment of the process almost universally adopted in France for the preparation of emulsions, and which is little, if at all, employed elsewhere. The very fact that our Gallic neighbours, who employ a process of their own, are those only who complain of a certain defect in emulsion working is in itself a strong argument in favour of the supposition that the defect is one of detail rather than of *principle* in washed emulsions, and the experiments we shall mention in the course of this article leave little doubt that such is the case.

It will be within the recollection of most of our readers that in the early part of last year the prize, offered jointly by the French Photographic Society and the Minister of Public Instruction, for the best dry process was awarded to M. Chardon by the commission appointed for that purpose. The Chardon process may be said to have been, if not the first introduction of emulsion photography into France, at least the first step towards its popularisation in that country, and still forms the basis of French emulsion work. Like the majority of new processes of the present day it consists of a grouping together of the best points of already-existing methods, the only really novel feature it possessed being the employment of precipitated pyroxyline, *i.e.*, pyroxyline thrown down from its solution in ether and alcohol by the addition of water. As we pointed out at the time, the effect of this modification was to render the subsequent precipitation of the emulsion in a fit state for re-solution a matter of certainty rather than of speculation, as it had hitherto been, and, in fact, the process greatly facilitated the preparation of an uniform and workable emulsion.

It will be remembered that at the time of its publication we devoted considerable attention to the new process, and spoke highly of the quality of the results obtained by its means. Up to the present time we have had no reason to alter the opinion then expressed with regard to the properties of the *freshly-prepared* emulsion; but, viewed from another point—its keeping power—we are compelled to acknowledge that it falls far short of other processes in vogue in this country. Our experience with the Chardon process, in its integrity, has not been sufficiently systematic to enable us to form an accurate opinion as to the limit of time the emulsion will keep good; but when, a few months ago, the results of some experiments made by MM. Chardon and Audra, on the keeping properties of the plates and emulsion, were communicated to the French Society, we were reminded that a bottle of the Chardon emulsion still remained on our shelves, and we at once proceeded to test it.

The results of the French experiments proved that, when properly packed, the dried emulsion as well as the prepared plates were unaffected by a sea voyage of three months, during which they were exposed to great heat, but that the dissolved emulsion under similar circumstances had much deteriorated. Our own experiments with the emulsion prepared eight or nine months previously showed that it had become utterly useless; it still retained its power of producing an image, but the film was of such a thin and granular nature that it was quite impossible to develope a satisfactory picture.

It was evident, from the appearance of the film and the thinness of the emulsion, that the cause of deterioration lay in the collodion rather than in the sensitive material of the emulsion. The suspended bromide certainly had lost much of the peculiar richness of colour by transmitted light for which the Chardon emulsion is remarkable, but that we attributed to decomposition of the collodion and consequent diminution of its power of holding the bromide in suspension, and our subsequent experiments tended to support this belief.

We had on hand several samples of precipitated cotton, including the remains of two of M. Chardon's own preparation, forwarded by Mr. W. R. Harrison, our Paris correspondent. With these we made five separate emulsions, employing the same proportions of bromide of silver in each case, the former being slightly in excess. A sample of ordinary commercial cotton was emulsified at the same time, the object being to ascertain which would remain in working condition for the longest period in the unwashed state. The different emulsions made from precipitated cotton assumed a deep ruby colour almost immediately after the addition of the silver, and within half-an-hour gave rich "creamy" films; the sample made from ordinary pyroxyline at the end of half-an-hour gave, however, a very thin and transparent film, and after twelve hours was still apparently far behind the others. But trying plates at that stage there appeared little difference in sensitiveness, though, as might be expected from the difference in the samples of cotton, the character of the development as well as the resulting image varied much with the different emulsions. Those from precipitated cotton developed quickly, and intensified readily with alkali, the deposit being opaque; with the ordinary pyroxyline the development was more gradual and intensification comparatively difficult, and the deposit more translucent in character, as if composed of finer particles.

Not to prolong the description unnecessarily, we may say that within four days from sensitising the whole of the five samples from precipitated cotton were quite useless. After about thirty-six hours the turning point seemed to be reached; the emulsions commenced to lose their richness of colour, and the development became more and more feeble and uncertain, until at last nothing but a faint, fogged image could be obtained. The remaining sample retained its good qualities for about a fortnight; it was difficult to tell exactly when it commenced to deteriorate, the changes taking place more slowly than in the other cases.

This experiment showed clearly that in the unwashed emulsion—that is to say, in the presence of soluble salts, which might possibly exercise an important influence on the result—the precipitated pyroxyline is far inferior in stability to that ordinarily employed; it remained now to try how far this instability extended to the washed or precipitated emulsion. The following experiments were unfortunately not performed contemporaneously; but, as far as possible, the same conditions were observed throughout, in order to preserve the comparative character of the results. It is impossible to follow minutely the individual experiments, so we shall briefly summarise the principal facts noticed. Adhering to the same formula, several emulsions were prepared from cotton precipitated by ourselves with both hot and cold water, or, as M. Chardon designates the two sorts, *pulverulent* and *resistant*. These were allowed to ripen for periods varying from six to thirty-six hours, and were then precipitated, some with hot and some with cold water. Two samples were treated by pouring out, and washing one with hot, and the other with cold, water.

Upon re-emulsifying the results varied very considerably. Samples allowed to "ripen" for thirty-six hours produced very inferior films, even when newly dissolved; but when the "ripening" was not prolonged beyond half that period the new emulsions were all that could be desired. The difference in their keeping powers was, however, very remarkable, some appearing to deteriorate steadily from the commencement, others successfully resisting the test for several weeks. With one or two exceptions, caused, no doubt, by slight accidental variations from the general conditions, the following facts were observed:—The "*coton pulverulent*" was subject to more rapid deterioration than the "*coton resistant;*" precipitation with hot water led to a similar result, though when newly dissolved the emulsion from hot water gave, perhaps, a better film than that from cold. The pulverulent cotton, as also a precipitation of the emulsion with hot water, gave a more porous, "dusty" film than was obtained under reverse conditions; the development was more rapid (in many cases high lights and details appearing simultaneously) but less vigorous, and density very difficult to obtain. The best results as regards keeping properties were obtained with the two samples which were "washed." The deterioration was in some cases so gradual that it was almost impossible to say exactly when it commenced or when the emulsion became unworkable; in fact, at the present time, after the lapse of four or five months, some of the samples have not altogether lost their working qualities, though they are by no means perfect.

In conclusion: we must express a very strong opinion that it is to the employment of precipitated cotton that we must look for an explanation of the want of keeping properties observed by M. Audra. That gentleman's remarks upon the change which occurs in the character of the film by keeping the collodion for some months previous to sensitising prove that it is more unstable than pyroxyline which has not previously undergone the ordeal of precipitation, and it is only reasonable to suppose that a repetition of that treatment must lead to a further development of the defect. The employment of hot water, too, appears to exert an injurious effect both on the stability of the cotton and on the character of the developed image. The general experience of washed emulsions in this country is that, provided the newly-dissolved preparation be in good condition, it will remain so for many months or even years, and that the whole secret lies in the capacity of the pyroxyline to resist decomposition, in which respect precipitated cotton appears to be deficient.

Since writing the above we have received a communication from Mr. W. B. Bolton upon the same subject, which will be found in another column. Although the writer views the question from a somewhat different standpoint, the general result of his experience appears to coincide with our own. It is important that the question of the stability of emulsions prepared by precipitation be settled as early as possible; and we therefore press the subject upon those of our readers who are interested in this branch of photography.

RETOUCHING.

In our last we left this subject at what may be termed the first stage—the preparation of the surface of the varnished negative so as to cause the pencil to "bite" or "take"—that state, brought about by the use of the turpentine and dammar medium, being the one we most recommended.

Keeping to the mechanical aspect of the subject, we may now describe the pencils to be used—the great desideratum being one with a tough texture, and capable of taking a fine, hard point. It is contrary to the usual plan we adopt to mention the name of the maker of any article of common use; but in the case of pencils we are justified in breaking it, for we may say that some little time ago we instituted trials of nearly every make of pencils we could obtain, and one pencil has come out conspicuously the best in every desirable quality to the retoucher. We allude to the best octagonal blacklead pencils of Faber, which in contrast with many we have tried are, as a retoucher once observed to us, "almost capable of doing the retouching themselves." We have also more recently been shown some very excellent pencils with the black lead in long sticks capable of being inserted in the pencils or pencil cases, and secured in their place by a simple arrangement, the whole being very light—a most important consideration. For retouching upon the matt varnish we described last week, the gentleman alluded to informed us that he could not, with comfort, use any pencil but the pure Cumberland lead as obtained from one of the Keswick manufacturers. Our readers may be aware that blacklead pencils are now made by compressing finely-levigated plumbago into a mass, and this, even in the best, is liable to contain gritty particles, which break through the matt surface.

It is desirable to have three or four different degrees of hardness of pencil so as to suit every class of work, the HH, H, F, and HB being the most suitable. The H is for general work; the HH (the hardest of the four) for very fine and delicate execution and where little labour is required. The F and HB are suitable for heavier pencilling when the shadows are heavy and considerable opacity is needed. It is customary to point them in a manner quite different from what one is usually accustomed to do. The lead is laid bare to the extent of almost an inch, and a more or less fine point given to it according to the negative under treatment.

Having now arrived at our surface for pencilling upon and our pencils for working with, it is time to describe the stand for holding the negative, usually called a "retouching easel." Some very useful and elaborate easels are described in our advertising columns; but, as they will be much more expensive than many of those for whom we write would require, we may say that, primarily, all that is needed is a sloping board with a central aperture, and sustained at a proper angle by a leg or strut. From this, as a beginning, are built with greater or less convenience and variety of adjustments all the more expensive and elaborate stands. Some contrivance is required to keep negatives of various sizes in their places, which is often done by a series of frames fitting one into the other. The simplest and, we think, the best arrangement of the kind we are acquainted with is formed by means of a slight bar placed across the whole width of the stand, with grooved side pieces attached to clip the stand and retain the bar in its place. The bar is thus movable upwards and downwards, and clamped by the simple act of drawing one end a little downwards, and so tightening its hold upon the stand by means of the groove. It is also necessary to prevent the negative from receiving any light upon its upper (the prepared) surface; and this may be done by suspending a piece of black velvet, or even brown paper, over a wire or other support fastened to the stand. It will be found much better not to make this easel too diminutive, as it is apt to cramp the hands if sufficient room be not allowed.

The light is to be thrown upon the negative from below, and upon its due modulation depends much of the success with which the negative may be finished. There is much discrepancy of opinion among retouchers as to the kind of light to be employed, some preferring artificial, and others not caring to work at all if they cannot have daylight. Very possibly the preference for artificial light may be due to the fact that so many photographers find it easier to work at their negatives when their day's work of negative producing, &c., is over, and they can keep to their pencil without interference, there being nothing so conducive to bad and uneven work as frequent interruption. When daylight is to be used the easel must be placed in front of a window commanding a view of the sky, and under the aperture should be placed a small mirror so arranged by means of a little packing that the retoucher, looking through the aperture, can see reflected in the mirror the sky in front of him.

For some negatives it is sufficient to place a piece of white paper in place of the mirror, while most others will require a piece of obscured glass, placed either between the mirror and the sky or between the negative and the mirror as may be found most convenient—taking care, if the latter method be adopted, not to place the glass too close behind the negative or the grained surface will interfere with nicety of touch.

Those who employ artificial light generally prefer to have a slight blue tinge imparted to it, to soften the heating and irritating effect which accompanies the flame of gas, &c. An ordinary paraffine lamp is preferred by many, but we find a good fishtail gas burner, fastened to a small stand, to be much more handy and equally useful—the former, of course, being preferred by those who have not gas connections at hand. The blue tinge may be produced by procuring an ordinary plain bedroom water bottle and filling it with water, and throwing into it a brushful of indigo colour. This, placed in front of the light, softens and cools it in a most pleasant manner.

In our correspondence column we publish this week a letter from Mr. W. B. Woodbury, narrating his experience with the ferrous oxalate developer, on which we may make a few remarks supplementing what we have previously written upon the same subject. A few weeks ago we described the anomalous behaviour of a quantity of the ferrous oxalate solution, which a few days after preparation had become totally deficient in developing power, though another portion of the same solution had worked well to the last drop. We have since submitted this enfeebled solution to the action of metallic iron, as proposed by Mr. J. W. Swan, with but partially successful results. After remaining in contact with a quantity of iron wire for several days it was found to have acquired the power of developing a feeble image, whereas before that treatment it exhibited no developing power whatever. The development, however, was of no practical utility, being of such an inferior character as to possess no interest even from an experimental point of view. As in Mr. Woodbury's case, the addition of a very small quantity of ferrous oxalate restored it to something like its original state; but the improvement was only temporary, as after a few hours' lapse it again became inert. The very small quantity of fresh oxalate which is requisite to restore the developing action at first puzzled us, as we were unable to comprehend its action upon the portion already in solution. Subsequent experiments have led us to the belief that the restored action is due entirely to the fresh oxalate, and not to any "revivification" of the old solution; in fact, we find that a solution many times weaker than that usually recommended is capable of giving a satisfactory development, though it is much slower and more under control than when employed stronger. Until the uncertainty which attaches to the keeping powers of the ferrous oxalate solution is removed it will be advisable, as Mr. Woodbury suggests, to mix only such a quantity as may be required for immediate use. We have found that by keeping the solution in contact with metallic iron it appears to retain its powers for a longer time, though in view of the eccentric manner in which different solutions behave it is quite possible this improvement may be only accidental.

ON THE CONTINUATING ACTION OF LIGHT, AND THE THEORY OF ALKALINE DEVELOPMENT.

I am much obliged to Captain Abney for the kind manner in which he discusses my criticisms of his important and scientifically-carried-out experiments; and it is with pleasure that I now reply to his last communication.

It is quite possible that I may be mistaken to some extent in my ideas of the nature of the "continuating action of light," and I must say that I thought the term applied to the effect on the *developable* image as well as to the visible image produced by the prolonged action of light. By this I mean that what may be called a "deoxidation" (de-chlorisation, &c.) of the silver haloid *continued*, not that an "oxidation" commenced—this latter action being a destroying action so far as the *developable* image is concerned.

So far as I can make out, I believe that Captain Abney is right in saying that the action of the red rays is, what we will take for granted to be, an oxidising action; but, on the other hand, I cannot find any evidence that the "oxidised" image was, in Becquerel's experience, a visible one, as Captain Abney infers. Claudet and Becquerel found that the "latent image" on the daguerreotype plate was destroyed by the action of the red rays, and that (presumably) the surface was restored to its original state. Those interested in this subject will find Claudet's and Becquerel's experiments quoted in an extract from a paper by Dr. Frankland, included in a communication from the late Mr. Sutton, at page 38 of The British Journal of Photography for 1872.

I may be wrong, but I do not think this action there referred to is the "continuating action" to which I refer; but I am doubtful whether I shall be able to adduce the evidence which I believe exists. I may, however, quote a passage from Mr. Sutton's paper which bears upon the action—whatever it should be called—to which I refer. He says:—

"These same experiments have been made the basis of a physical theory of the latent image in the collodion process; but has anyone ever observed the effacement of a latent image by the exposure of a plate to the yellow light of a dark room? I fancy not; on the contrary, we heard not long ago of a plan for reducing exposure by admitting red light into the camera through a hole in the front fitted with a trough filled with a red liquid. How could this be if red light effaces the image and undoes the work of the actinic rays?"

With regard to the non-effacement of the "latent image" by the yellow light of the ordinary dark room referred to by Mr. Sutton, it may be that the actinic and "destroying" rays for a particular class of sensitive film about balance each other in effect, so that the action is *nil*. Here, at any rate, we have a reference to the kind of "continuating action" to which I refer, whoever may be the discoverer, or alleged discoverer, of the "process" in question.

I have a distinct recollection of having, in the days of my earlier experience, exposed a piece of ordinary sensitised chlorised paper for a short time under a negative, and then of having transferred it to another frame, where the negative was replaced by a piece of ruby glass, in the more or less (probably less) faith of obtaining an intensified visible image. I have, moreover, a distinct recollection that I *failed* in what will appear to many to be a scientific adventure worthy of a Don Quixote; nevertheless, as my ideas at that date were not generally evolved from an inner consciousness, it seems to me highly probable that my experiment was initiated by those of others in a similar direction.

I intended to have made it plain in my last communication that the experiment with the three films, referred to by Captain Abney, was a purely imaginary one—at least so far as my own actual experiment is concerned. But I certainly believed that with Captain Abney the hypothesis there brought forward was an accomplished fact. Did not Captain Abney find that an exposed or developed film, coated with another bromide film, and then developed by the alkaline developer (the latter film not being exposed to the "actinic rays") produced this effect?—that the film acted on by the actinic rays developed (say) half through the thickness of the film, this under portion developing first, and that in a more or less short space of time the whole of the upper film was reduced without reference to the extent of the reduced silver underneath; that is to say, that wherever the upper film was underlaid by reduced silver reduction took place, this reduction proceeding upwards? I am uncertain, however, whether the reduction proceeded at the same rate in those parts over the half tones as in those parts over the high lights. I had certainly intended to have stated as clearly as possible Captain Abney's own experiment. I may state that, in order that my theory (or Captain Abney's, whichever it may be) should hold good, it should be possible, by exposing a bromised plate with the back to the lens, to develop an image *all through* the film, because the first reduced bromide, or sub-bromide, would underlie the surface of the film.

I had looked upon my version of Captain Abney's experiment as a statement of fact—a fact which I never thought it worth while to question. Of course, if what I have stated be only an imaginary fact, the *raison d'être* of my argument—that the particles of bromide in a film have the same relative position both before and after reversion—ceases to be.

When Captain Abney first published his experiment I inquired of him, by letter, whether he could account for the reason why the effect was not to be obtained with certain double films with which I was then experimenting. The films were composed of a sub-film of sensitive collodion emulsion, covered by a thin film of gelatine emulsion. I understood that his opinion was that the upper film being most affected by light the developing action did not proceed downwards. He also added that he had found that gelatine emulsion did not answer when used in the same manner as collodion emulsion; that is, when an exposed or developed film was coated with gelatine emulsion and then acted on by the alkaline developer, the impermeability of the gelatine being the probable cause.

Captain Abney states that he intends to repeat some of his former experiments. I, too, will make some trials when I can conveniently do so.

I have been testing volumetrically some solutions of zinc bromide and chloride with silver nitrate solution, and the following question has again occurred to me:—If to a solution of silver nitrate in water acidified with nitric acid a solution of a soluble bromide be added, the silver nitrate being in excess, and the whole be exposed to light, the silver bromide darkens, or becomes of a dirty yellow. Bromine is ejected—it is said as hypobromous acid. From what I can gather from Watts' *Dictionary* the action may be thus: that the nascent bromine acts upon the silver nitrate, half the bromine being precipitated as bromide, and half remaining in solution as hypobromous acid. If this be so, it is not scientifically correct to test a solution of a bromide with a standard solution of silver nitrate (the latter being in excess), unless the operation be conducted in the dark room; for some bromine would do work more than once—first, by precipitating $Ag_2\ Br_2$, and then, after leaving $Ag_2\ Br$, by combining with more $Ag\ NO_3$.

The actions may be thus expressed, zinc bromide being used:—

$$2\ Ag\ NO_3 + Zn\ Br_2 = Ag_2\ Br_2 + Zn\ N_2\ O_6.$$

Then, by the action of light—

$$2\ Ag_2\ Br_2 = 2\ Ag_2\ Br + Br_2.$$

Lastly, by the action of the nascent bromine on silver nitrate and water—

$$2\ Ag\ NO_3 + 2\ Br_2 + 2\ OH_2 = Ag_2\ Br_2 + 2\ Br\ HO + 2\ H\ NO_3.$$

By dividing the last equation by two we have an atom of bromine from every two molecules of silver bromide acted on by light going to form more silver bromide. To this extent, then, extra work is performed by the same atoms of bromine. The consequence would be that less soluble bromide would appear to be required. It, moreover, will not do to go on adding soluble bromide till the normal colour of the bromide has returned, even if this part of the operation be performed in the dark room ($2\ Ag_2\ Br + 2\ Zn\ Br_2 = 2\ Ag_2\ Br_2 + 2\ Zn\ Br$), as half of the bromine is present as hypobromous acid, and has not precipitated silver. HERBERT B. BERKELEY.

A WET-PLATE DEVELOPER.

AN interesting article by your able correspondent, Mr. M. Carey Lea, in a recent number of your Journal, directs attention to the action of cupric salts, combined with gallic acid, in the development of dry plates. Some years ago I was desirous of obtaining a developer to be used in a tent of small area for wet-plate landscape delineation that would give, without prolonging the exposure, sufficient printing density at one operation. Amongst other researches I experimented with the then suggested additions of copper salts to the ordinary ferrous sulphate developer, but without gaining any noteworthy advantage. I find, however, upon an incidental reference to my notebook, suggested by the above-mentioned article, under date April 23rd, 1872, the following formulæ, and remarks reserved for further consideration in connection with wet-plate photography in the field:—

"A.

Cupric sulphate	1 ounce.
Water	3 ounces.

"B.

Pyrogallic acid	10 grains.
Water	1 ounce.

"The saturated filtrate from the former is to be mixed with an equal volume of the latter. The mixture affords a solution equal in power with the ordinary iron developer, and gives sufficient intensity without subsequent treatment with pyro. and silver. The details in the shadows are as well rendered as when using protosulphate of iron followed by intensification. The addition of acetic acid to the extent of ten minims to each fluid ounce of the mixture renders the action of the developer slower without otherwise modifying its general efficiency."

I have recently re-tested the developer, using an old bath and collodion made according to my lately-published formula, and not only find the correctness of my former deductions fully confirmed, but notice an additional advantage. Negatives can be obtained with full printing density, and good rendering of the parts in shadow, with a *shorter* exposure than is requisite with the ordinary ferrous developer and subsequent intensification.

A convenient practical formula I herewith annex:—

A.

Cupric sulphate	1 ounce.
Acetic acid	15 minims.
Water	5 ounces.

B.

Pyrogallol	96 grains.
Alcohol	1 fluid ounce.

To each fluid ounce of the filtrate from A add forty minims of B, being equivalent to the addition of one grain of pyrogallol to each fluid drachm of the cupric solution. The mixture may either be made immediately before or within twenty-four hours of its application to the film.

Under many circumstances, especially when working in the photographic laboratory, the ordinary method of keeping the development apart from intensification is highly advantageous. When manipulating, however, in a tent of limited area the use of a developer capable of giving full detail and sufficient density simultaneously becomes of great advantage, and possibly the balance in favour of wet plates over dry depends on the issue. However this may be, I introduce the above developer, not as a substitute for existing ones, but as an additional power vested in the hands of the practical photographer. T. SEBASTIAN DAVIS, F.C.S.

PRACTICAL NOTES ON CARBON PRINTING IN HOT WEATHER.

ALTHOUGH *summer* weather has not made its appearance amongst us until within the last few days, yet short as has been its duration many young beginners in the carbon process have had to undergo some little difficulties which older and more experienced workers have been prepared for, and thus avoided. To novitiates in the process I think a few hints at this season may be of some service, even at the risk of being charged with telling a twice- or even thrice-told tale.

Mr. Blank writes to me saying that upon sensitising his tissue (a new supply) he found that its pigmented surface dissolved off in the bath, although it was the same one he had used with perfect success for the previous batch; so he says that, of course, it is the tissue that is at fault. More experienced hands would have at once known that it was the increased temperature that had brought about this result. The temperature of the sensitising bath should never *exceed* 60°, but the old bath my friend was using had been kept in an ordinary room, and so had become heated to something over 70°. It should be borne in mind that carbon tissue is more soluble in a solution of bichromate of potash at a given temperature than it is in plain water.

Now, as I have said that the bath, for successful working, should not exceed 60°, this temperature may easily be secured, even in the hottest weather, by substituting a pound or so of ice for an equivalent of the water used in making the bath, or by making it with freshly-drawn spring water, which rarely in summer exceeds 50° or 55°. The precaution should also be taken, in sensitising the tissue, not to place the hands in the solution more than can be avoided, as their heat will soon raise its temperature 20° or even 30°.

After removing the tissue—which should only have been allowed to remain in the bath until it has become thoroughly limp—it must be placed on a sheet of glass, or, if very large, on a sheet of zinc, face downwards of course, and a squeegee passed over the back so as to remove a large proportion of the solution. After this treatment there will be little danger of the gelatinous coating running off in the drying, even if the temperature should be somewhat high.

It should be remembered that if the tissue be squeegeed off a large proportion of the bichromate of potash solution is removed, and allowance must be made for this in the strength of the bath. Thus, a bath of three and a-half per cent. will give quite as strong a sensitised tissue, when not squeegeed, as will a five-per-cent. bath when so treated.

The drying of the tissue requires quite as much attention in a very dry season as in a very moist one, for many tissues, if dried too quickly, will reticulate, and also wash up in the high lights; although some are not subject to this evil, however quickly the drying may be effected, but all may be made to work satisfactorily by slow drying. If, however, a batch of tissue should be found to reticulate owing to proper precaution not having been taken, it need not be wasted, for if after (or before) printing it is coated with collodion and allowed to dry it will be found to work quite satisfactorily. A wet and dry bulb thermometer should always be suspended in the drying-room, so that the operator may see at a glance the state of the atmosphere, and so secure any length of time in drying, either by lighting a fire in the grate or stove should the room be too damp, or by watering the floor with a watering-pot should it appear too dry.

I prefer that tissue for chromotype work should be dried at a temperature of about 60° or 70°, and when the difference between the wet and dry bulbs is about 5° or 6°. Should the high lights of the picture be found to wash out—a no very uncommon occurrence when the temperature is very high—it may be remedied by keeping the tissue for a day or two before using it, or by giving it a very brief exposure to light after removing it from the printing-frame—of course not sufficient to tint the whites of the picture.

There is another matter that requires attention during this season, namely, the temperature of the water used to soak the tissue in previous to mounting it on the support upon which it is to be developed. This water should never exceed 55° or at most 60°, or breaking up of the picture may happen. This temperature is likewise secured by the use of a little ice or, more economically, by the use of freshly-drawn spring water. This will also greatly tend to prevent the washing up of the high lights of the pictures.

In the foregoing remarks I have had in view more especially the development of prints on glass (chromotypes) or other rigid support, although they apply equally to single transfer or to Sawyer's flexible support, except that in these two latter processes the reticulation so frequently met with in the former are seldom seen.

During the last few weeks the atmosphere has been very highly charged with electricity, and great care has been required to prevent the finished picture developed on glass being covered with innumerable small specks of dust, owing to the highly-electrical condition of the plate when freshly waxed. A few days back a plate of this kind attracted and supported a good-sized piece of tissue paper. Such a plate would, of course, soon be covered with dust should any by chance be in its neighbourhood, and which could not be easily removed by brushing while in this condition. The plates must not be used for ten or fifteen minutes after waxing, when any dust that may have been attracted by these can easily be removed by passing a broad camel's-hair brush *lightly* over its surface. E. W. Foxlee.

ON THE KEEPING QUALITIES OF WASHED EMULSION.

The almost universal experience of those who have worked much with washed emulsions goes to prove that for some imperfectly-explained reason the plates prepared by that process are much more liable to spots and blemishes than those which have to undergo washing and organifying previous to drying. But, though all attempts to provide a sure remedy for this fault have so far proved at best but partially successful, the simplicity of the process and the uniformity of its results combine to retain for washed emulsion a high position in popular favour. At the last meeting of the Photographic Society of France, however, M. Audra read a paper in which he lays a charge against the process which, if well founded, removes at once its chief recommendation, and leaves no counterbalancing gain to recompense us for the trouble and extra expense of washing the emulsion. In short, M. Audra states that the emulsion becomes useless within six weeks of solution—a period during which it is no uncommon thing to find an ordinary unwashed collodio-bromide emulsion retain its working properties. This experience of M. Audra is, however, so contrary to my own observations, and those of many others who have worked the process for the last four years, that I think we may safely conclude it to be an isolated case, or, at least, that the result springs from some special detail connected with that gentleman's mode of working. Such is my own view, and I shall endeavour to point out where and how M. Audra fails in securing a keeping emulsion.

From a perusal of the paper read before the French society it will be seen that M. Audra works the Chardon process—if not in its most minute details, at least with sufficient closeness to render his method virtually identical with that of M. Chardon; consequently my remarks may be taken as bearing upon the Chardon process generally, and not upon the particular formula stated by M. Audra. There are two, or I may say three, points in that process which I believe from experience to be conducive to the unfavourable result recorded in the paper to which I have alluded—precipitation of the emulsion in place of simple washing; the employment of pyroxyline which has already undergone precipitation; and the addition of an organifier to the final emulsion.

The first two of these conditions may, perhaps, be considered merely as variations of the same inducing cause; but I prefer to treat them separately, as the ultimate effect differs in the two cases. My readers—who I presume are emulsion workers—will scarcely require to be reminded of the different results given by the same emulsion when unwashed, washed, and precipitated respectively. An emulsion which previous to washing gives a clear, dense picture is frequently found after the performance of that operation to produce results quite the reverse; while others, though capable of resisting the washing, break down entirely under precipitation. These differences have been ascribed—and no doubt rightly—to the solvent action of the diluted ether and alcohol, which are present in larger quantity in a thick layer of emulsion than in the extremely thin film extended upon a sheet of glass.

This action, whatever it may be, is evident in the physical character of the final emulsion when newly dissolved, and I wish to suggest a possible explanation of the deterioration that takes place in an emulsion which upon re-solution is in good working condition. The properties and reactions of pyroxyline have formed the subject of a great amount of research, and one important observation—made, I believe, by M. Camuset—seems to bear directly upon the present question. It is that pyroxyline precipitated from its solution in ether and alcohol becomes altered in its chemical composition, combining *chemically* with a large proportion of water, one equivalent of the cotton taking up (I speak from memory) six equivalents of water. If such a change occur in the precipitation of an emulsion—and presuming, for the sake of clearness, that the sensitive silver compounds are not altered thereby—there must still be a vast alteration in the physical character of the pyroxyline, upon which the keeping properties of the emulsion largely depend.

I may not be correct, but I have always considered the keeping qualities of a washed emulsion to be limited only by the stability of the pyroxyline. All pyroxylines, when kept in solution as plain collodion, become gradually changed, until at last a dusty, opaque film is given when the collodion is poured upon glass. This is the only change which *ought* to take place in a properly-washed emulsion, for we can scarcely imagine that the insoluble particles of silver bromide can exert any chemical action upon the collodion. When the finely-divided bromide becomes granular or altered in character I should attribute it to this decomposition, which deprives the collodion of its power of retaining the bromide in the state of fine division which is necessary, and not to any reaction between the organic and inorganic constituents of the emulsion. I speak now, of course, of an emulsion of pure bromide of silver.

I have so far attempted to show theoretically the manner in which I believe precipitation may affect an emulsion. Practically I have found the results obtained with different forms of emulsion to accord closely with this theory. There can be no doubt that the method of precipitation is a great improvement upon the older and more cumbrous plan of washing, at least as regards convenience; but the question is—Does it affect the permanency of the emulsion? I reply distinctly that I think it does. There is certainly a great temptation to adopt the simplified method; and I, along with many others, have for some time done so, but somehow I fail to produce emulsions of the same quality I used to get. They may be all right at first, but after standing for a few days there is a noticeable though indescribable difference in their working; and, though I cannot give so unfavourable an account of my experience as M. Audra does, I should certainly, for any particular work, prefer to use a newly-dissolved emulsion rather than rely upon an old one. I have the remains of several samples of emulsion prepared by washing, from twelve to eighteen months ago, which remain in much better condition than more recent samples obtained by precipitation. Indeed, except for their having become thick from use, I can see no deterioration at all.

There is one very striking difference between emulsions prepared by the two methods. If set aside for several days to allow the bromide to subside it will be found upon reversing the bottle that in the case of the washed emulsion the deposited bromide runs down the sides of the bottle in oily lines or streaks, and that comparatively little shaking is necessary to thoroughly re-emulsify it. With the precipitated emulsion, on the contrary, there is an even wave of extremely minute particles, not individually distinguishable, but conveying an impression of granularity, and a very considerable amount of shaking is necessary to get the whole into suspension. The deposit detaches itself in hard "caky" pieces, and seems to have thoroughly dissociated itself from the fluid portion of the emulsion.

Before concluding I wish to say a few words on the employment of organifiers in the final emulsion. In my earlier experiments I recommended this plan, as from insufficient knowledge of the requirements of the process I was unable otherwise to obtain a film sufficiently permeable to the developer. Among the substances thus employed were soap, tannin, gallic acid, tolu balsam, and quinine—all of which I found in course of time to produce a peculiar sort of reticulation upon the dried film. The structural markings were quite invisible on the moist film; but when dry the surface was found to be covered with irregular streaks and waves of an extremely fine transparent network. Quinine either pure or in the state of sulphate produced this effect in a very short time, and had, besides, a very injurious action upon the keeping qualities of the plates after exposure.

I will mention one more cause of the gradual deterioration of emulsions, namely, the employment of weak solvents. The best emulsions, both as regards quality of film and keeping qualities, are those made with solvents as free from water as possible. The presence of the latter in any considerable quantity not only renders the film repellent and lumpy, but after a few weeks causes the bromide to become coarse and granular. The film acquires a harsh, dusty appearance when dry, and frequently splits away in shreds. If M. Camuset's observation of the hydration of the precipitated cotton be correct, the introduction into the emulsion in this manner of a considerable quantity of water would no doubt conduce to a similar result.

I have dealt with this subject from a purely physical point of view, because, as I have stated, I believe the keeping qualities of the emulsion to depend entirely upon the stability of the cotton, provided all soluble matter be eliminated. Anything which tends chemically or otherwise to alter the physical character of the collodion, and to render it liable to decomposition, is to be avoided; hence precipitation is, I think, open to considerable suspicion, as also the addition of organic substances to the final emulsion and the use of weak solvents.

W. B. Bolton.

ON THINGS IN GENERAL.

Tehre has recently been quite a little buzz of excitement, raised through causes photographic, in the columns of several periodicals. Some members of the fair sex, whose vanity is said by their detractors to be their most prominent mental development, have been—"by permission," of course—exhibited in photographic "counterfeit presentment" in nearly every shop window in the kingdom, and a torrent of abuse has been heaped upon them. Why should they not be exhibited and sold?

"An honest man's the noblest work of God,"

and a handsome woman the most beautiful; and why, I repeat, should she not, by means of photography, be exhibited to an admiring world? The fact of vanity being at the bottom of the show does not matter one jot. There is an old Indian tradition that in the early days of the world there were no women, but only men, who were possessed of tails upon which they lavished all sorts of caresses and dressed up and trimmed with all beautiful things. Their only trouble was that they were not loose, and that they thus could not carry them about as they wished. Prayers to their gods resulted in success, and their tails were loosed and converted into women. They had not had them long before they wished from the bottom of their hearts that their tails were in their old places; but that was never granted again, and their vanity is reflected in the sex to this day, as any portrait photographer could readily tell. I wonder what tradition the natives will invent after a few hundred years' familiarity with the camera and its product—possibly they will evolve a woman out of a *carte-de-visite*.

I read somewhere in these pages that the grand "all-round" discussion at the Photographic Society of Great Britain should lead to discoveries about pigments for carbon printing. We want them, for there is still a void to fill in the production of pigment papers—permanent, rich, and beautiful. What I like about this Society is its perfect freedom. It is so nice to go and hear read a really good paper, yet full of spicy personalities, and followed by a discussion of an entirely commercial nature—one of your useful nights, devoid of those wretched scientific discussions that everyone yawns at and would like to cut at once if it were not for the look of the thing. But what did the President mean by saying he hoped Mr. Sawyer would fulfil his promise. He promised us a photograph of parallel lines some time since. Hasn't he sent it in yet? I wonder.

I saw, too, another promise made through The British Journal of Photography. Mr. Washam had invented a new process of considerable interest and spent a good share of an hour in writing about it, but yet could not find time to get a print from his negative showing results. Fie! Mr. W., you are not serving us right!—we are anxiously awaiting the Editors' verdict on your print.

Wet *versus* dry is still as lively as ever. The most interesting phase has occurred in America, the President of the Photographic Section of the American Institute having undertaken to do anything with his emulsion process that could be done with wet, and in one-third the time. Mr. Bierstadt accepted his challenge, and I hope something definite may come of it; for really the outer public are kept in a state of constant expectation in the matter. I am, however, afraid of the President's arithmetic, for he is reported as saying—"That with a process in which eight seconds is necessary, to give it twelve increases the time thirty-three and one-third per cent.!"

Another American gentleman advises us, when taking a sitter who cannot do without his spectacles, to avoid getting his "features refracted" through the glass, which would be as likely to succeed as the caudal chloride of sodium process for stocking aviaries. I must, in concluding, express my admiration for a new word in our vocabulary: for "head-rest" in future *read* "guide." Thank you, Mons. Villecholles!

Free Lance.

TRANSATLANTIC NOTES.

From the United States to Canada, across one or other of the suspension bridges that span the Niagara, is but a short distance, yet the difference between the two countries is, in some things at least, very great. Wisdom is said to come by experience, but it sometimes has to be paid for in hard cash. Here is a little that I paid sweetly for, and which intending travellers in those parts would do well to note. Before leaving New York, Boston, or Philadelphia see that you have a sufficient supply of English gold or silver for use in Canada. Being unacquainted with that simple "wrinkle," I applied to one of the banks in Niagara village, and readily got sovereigns in exchange for American "green backs," but had to pay about twenty per cent. for the accommodation!

I should have liked to have seen Mr. Notman and Mr. Henderson, of Montreal; but as that city lay far out of our route my first stay was made at Hamilton. London, Paris, &c., &c., were subsequently visited; but I feel bound to admit that neither in beauty, order, regularity, or apparently in business enterprise, are the towns in Canada equal to those in the States. It may be that there is as much business done, and that the business men amongst the Canadians are as wealthy as their American brethren; but there is certainly no visible evidence of it in their homes, either externally or internally, or in the dash and "go" everywhere seen in the States.

Hamilton is prettily situated on the banks of Lake Ontario, and consists of one principal business street, in which are some really fine public buildings, several large hotels, and numerous capacious and well-filled shops or stores—at least every third or fourth of which is a chemist's. Crossing at right angles in the ordinary way, as in the States, are a number of streets of lesser importance, but sadly deficient in the beauty everywhere so visible in towns of similar size in America. The city is, to a large extent, peopled with immigrants, the great majority of whom are from Scotland; and, as amongst these, home ties are proverbially strong, the demand for photographs is, as might be expected, very considerable, children of very tender age forming probably a large majority of the candidates for camera favours. The cause of this peculiarity, as explained to me by one of the photographers, would seem to be the desire of the young mothers to delight the eyes of the grandpapas and grandmammas in the old country with a look at each young "hopeful" as soon as possible after he or she makes an appearance in the new country; and, judging from the specimens everywhere visible, neither mothers or grandmothers are difficult to please. In this class of work ferrotypes are much run after—partly, in all probability, because they require but a short exposure, partly because they can be finished and delivered within a few minutes after the time of sitting, and partly, also, on economical principles, the usual price being a shilling for one, which in most cases is all that is required. I do think, however, that our Canadian brethren should try to give something better for that small sum, as, even after making due allowance for the fact that the many years which have elapsed since I had a personal interest in babies may have dulled my power to appreciate their beauties, peculiarities, and individualities, I do confidently assert that each is so like all the rest that an exchange might be effected without anyone being the wiser. They simply look like badly-stuffed pillows with much too long slips, and a bullet at one end, with several indentations, which convey about as clear an indication of the human countenance as do the markings on the moon of the man who is popularly supposed to reside there.

Of course the ever and everywhere popular *carte de visite* is also produced here in great numbers; but with one or two exceptions it is but little better than the ferrotype or tintype, as the Americans are pleased to call them. The prices are, on the whole, lower than in the States, being from six to eight shillings per dozen, and very dear at that. But the one or two exceptions are really first-class, and such as would do credit to any European photographer; and it was pleasant to find that here as elsewhere good work was both appreciated and paid for, two at least of the best houses getting some twenty-five shillings per dozen for their *cartes*.

The Canadians, more perhaps than any other people, "go in" enthusiastically for winter sports, and as they differ much from those in more temperate climates they never seem weary of getting themselves portrayed as if in their fullest enjoyment. In the show-cases of, perhaps, the most successful worker in this department—Mr. Fenwick—I was particularly struck with some beautiful examples of groups engaged in skating, snow-shoe walking, sleigh riding, and "tobogganing." I do not know if this last be correctly spelt, but the amusement consists in several people seating themselves on a plank, turned up at one end like the iron of a skate, which has been drawn to the top of a hill, and sliding down on the hard frozen snow with, to the eye of the uninitiated, dangerous velocity. The "toboggan" is guided in its descent by an iron-shod pole or stick, and, so far as my recollection serves me, much of the fun lies in the way in which a "spill" is brought about at the proper place and suitable time. The whole series was so well managed that, but for the announcement that character pictures were taken by arrangement, I should have thought they had really been photographed on the hills, rivers, or in the woods.

Of course I was anxious to see the actual production of such beautiful effects, and as usual received a hearty welcome from the proprietor. His establishment occupied the three stories of which the building consisted, the ground floor being a compound of reception room and picture gallery. Here there were shown some fine enlargements, made in New York and painted on the premises. They were quite equal to the average work in Scotland, and varied in price from four to twenty guineas. The first floor was devoted to beautifully-furnished dressing-rooms, painting room, and rooms for retouching, mounting, finishing, &c., &c. The third storey contained two large studios of the usual American construction—a large top light at a very gentle angle; with what little side light there was altogether shut out. In one of these an operator was busy with the ordinary kind of work, and that of a very high class, although there was not a single curtain to soften or direct the glaring light of a sunny Canadian day. The lack of curtains was amply compensated for by the use of movable screens of various shapes and sizes, all fixed to stands like head-rests; and for those who know how to use them they seem much better and more manageable than the usual method of curtaining.

This operator stated that he had made pictures for over twenty-five years in almost every town of importance both in the Dominion and in the Union, and that he would never use curtains again where he could have his own way. "You see," he continued, "it's light as makes the picture, and darkness ain't no good at all; so it stands to reason that the more light you have the better. I like to have it all round when I can get it, and when a sitter comes in I look at him well and make up my mind in what way he will look best. I then seat him on the platform, and wherever I want a shadow I hoist a screen, and move it backwards and forwards till the effect is produced." "A long time?" "Why, bless you! no; it is done in less time than it usually takes to pull up one curtain and pull it down again when you do not find it answer." The other studio had the side lights uncovered, and as it received the benefit of the full noonday sun it presented a sight not easily forgotten. The whole of the wall which did duty as a background was frescoed into a hazy wintry landscape, and executed in such a masterly way that the clouds and distant hills were represented in the photograph truer to nature than anything of the kind I had before seen. There was, however, but little of the background seen, as it was to a large extent covered by a very natural arrangement of leafless but finely-branching trees, masses of rock, both natural and artificial, and inclined planes of various degrees of angle, the whole, wherever it would lie, being covered with a liberal supply of salt mixed with minute pieces of crystal which shone and sparkled in the brilliant sunlight, producing a most charming and realistic appearance of a Canadian winter scene.

At the other end of the studio, hanging on the wall and piled on the floor, was a collection of the *matériel* for the amusements—sufficient, apparently, to start an enterprising caterer as a supplier of everything necessary for the winter sports. There were skates, sleighs, taboggans, snow shoes, and fur dresses, including the universally-worn fur cap, and those of all sizes and shapes to suite the tastes and ages of the patrons of the establishment. At the first glance one was apt to suppose that the whole secret of how the beautiful specimens I had seen below were produced was laid bare; but a careful examination of them showed that there was still something wanting in the visible arrangement.

Those who are acquainted with the introduction of groups in landscape work—especially where the figures are intended to play the principal part—know how difficult it is to get anything like a fine play of light and shade just where it is most to be desired, and that was just where the figures in Mr. Fenwick's winter scenes showed to the best advantage. The explanation lay in the use of movable screens, screens fixed to branches, screens on stands, and hand-screens—screens, in fact, that could be placed anywhere and everywhere, and which would either make or remove a shadow. Although the mention of so many screens may be apt to make the hair of some of the old curtain-loving operators stand erect, I can assure them that I here saw the most exquisite effects produced by such an arrangement in little more time than it takes me to write about them. Of course to do this requires artistic knowledge and genius too; but *pictures* cannot be produced without a combination of these rare qualities, and wherever they are found they will, if properly applied, always command a fair remuneration. I was, therefore, quite prepared for the information that for such photographs of about 8×6 inches Mr. Fenwick readily gets about fifty shillings per dozen, and an equally liberal remuneration for smaller sizes.

From Hamilton to Detroit is a long stride, but the art in the smaller Canadian towns is so much like that in the American towns already mentioned, only hardly so good, that I follow our route, and in my progress westward once more cross into American territory.

Detroit is, probably, one of the very best examples of the rapidity of the growth of American cities. Originally—and that but a short time ago—a small village on the west bank of the strait which joins Lake St. Clare to Lake Erie, it now extends in beautiful tree-lined streets as far as the eye can reach, the longer ones averaging from ten to fourteen miles. Its city hall, theatres, and other public buildings equal, if not rival, those to be found in any city in America, and its trade enables it to rank as the fourth or fifth city in the Union. Here, as elsewhere, photography receives a fair share of attention, but different from most other places, the average quality being decidedly high. Of course where professional photographers are numbered not by tens but by hundreds, there are some whose work will not stand inspection; but in no place where I have yet been is there so little that is bad and so much really good. As a natural consequence prices are, on the whole, better than even in New York and Philadelphia, *cartes de visite* bringing hardly ever less than four, and in many cases as much as six, dollars—twenty-five shillings.

Where all, or nearly all, are so good it is somewhat invidious to mention any one in particular; yet I cannot refrain from saying that I was much pleased with the exquisite work I saw in progress in the establishment of Mr. Bigelow. He, unfortunately for me, was in Europe when I called; but his obliging assistants were very polite and attentive, and afforded me an opportunity of inspecting the whole of the very complete arrangements, about which, however, there was nothing out of the ordinary run. Here, as elsewhere, wherever high-class pictures are produced they are the result of artistic culture and patient striving after perfection rather than of any pecularity in mode or material.

Before leaving Detroit I may remark that, in the arrangement of its streets, it is different from any city I have seen either in the old world or the new. Standing on the top of the city hall tower the visitor finds himself in the centre of a system of streets which branch off like the spokes of a wheel, some of them being so long that they are lost in the horizon, and all, or nearly all, so beautifully lined with trees that, after the distance of a mile or so, they look like a systematic arrangement of green avenues, the beauty of which must be seen to be understood.

From Detroit we passed on to Flint, through what had been a short time ago primeval forest; but now, thanks to the demand for pine lumber, a rich agricultural country, well supplied with rude but comfortable-looking farm houses. Flint—once the flourishing centre of a grand lumber district—is now apparently on the wane, although I think its present state of inertia is only temporary. It consists, like almost all its class, of a series of streets crossing each other at right angles; but except in Saginaw-street—and even there, too, to a certain extent—there is a general appearance of its having seen better days. There are many fine and comfortable-looking houses—the homes of families who have amassed wealth in the lumber trade—but the axe of the lumberer has long since ceased to be heard within a radius of many miles, and with its departure has gone the trade which made Flint what it is. There are, it is true, several saw mills still at work, but the logs are floated down the river from a considerable distance, and there is everywhere evidence that the glory of Flint as a lumber mart has departed. By-and-by, however, as roads get into good condition and farms become productive, Flint may experience a return of prosperity by becoming a centre for the supply of the wants of the agriculturist, and the Flintites may take comfort from the thought that, although such prosperity may not be so great, it will be more permanent than that on which it formerly relied.

Photography in Flint is, of course, no exception to the rule, and is in that sleepy state in which good work can hardly be expected. I visited some half-dozen studios, and each has the same story to tell—poor work and equally poor pay is general; although the latter is rather an effect than a cause of the former, as I found in many of the houses I visited beautiful specimens of portraiture, which the sitters had gone to Detroit to secure.

Probably the best work, as certainly the greatest amount of energy, was shown by a Mr. Thomson. He had been catering for the people of Flint for some years, but without such success as seemed to him satisfactory. He assured me that Flint was "used up," and that the only hope of business lay in getting at the country people; and as they would not come to him he had resolved to go to them. For this purpose he had built a light but convenient caravan, some twenty by nine feet. A portion of the side near one end was a foot broader and glazed, as was also a portion of the roof. It was mounted on wheels, and could easily be drawn by one horse, even on the rough American roads; and he was just about to start and visit all the villages in Michigan, quite sanguine of doing a remunerative trade before the winter snow compelled him to settle down somewhere for the season.

John Nicol, Ph.D.

THE BIG SHOW.

We Start.—Enlarging.—How Can We Get the Negatives?

Early in June I started to pay a visit to the Paris Exhibition. My friends insisted that the heat would be so great in the French capital during this season of the year that I would be sure to get melted, but having all my arrangements made I risked being turned from the solid into solution. Of course it is only little fellows (from a business point of view) in the country, like myself, who can feel of how much moment and consideration taking such a trip means. We who indulge in one or two holidays at a time, and are even then afraid in our absence that a sitter of importance might have been lost, require to screw our "courage to the sticking-place." There is an uneasy beating of the heart when anticipating the length of time that it will take, and the many chances of things going wrong during our absence, which have to be got over; but, having resolved to go, we subdue the twitchings of anxiety, and smile to think of the care we bestow upon so little, trying to forget for the moment that that little is our all. However, we made our arrangements, got our tickets, and started—four as merry fellows as you would meet in a day's march (excuse the egotism)!

On our way to London, to while away the time we had a conversation which, being photographic, might contain a germ of interest for the profession, and hence might be none the worse for being ventilated here. The subject was the enlarging of pictures and the growing demand for the same, and whether an easy method might not be arrived at whereby the exchanging or lending of negatives to each other could not be done in a regular business way, so that the copying of *cartes* would be reduced to a minimum, giving each and all the chance of obtaining the best results, and with a fair show of profits to all concerned.

Jack Smart, who started the subject, said :—"When a client brings me a *carte* and says 'I want a life-size head of this, how much will it cost?' I give him the price, and resolve at the same time to get the negative if I can."

"And if you can't, what then?" I asked.

"Copy the *carte*, of course," he replied. "But mind you this—I am always willing to give ten shillings for the loan of a negative at any time when wanted, and also I am always willing to lend my negatives on the same conditions."

"That's the only fair way," Henry said. "In these days of unions, if we could start a union for the giving and receiving of negatives at a price it would be an ordinary business transaction, and you would be free of the feeling of obligation you place yourself under now when asking a loan; in all cases, however, we would have to keep good faith with each other."

"There's where the shoe pinches," Tom broke in. "I have on several occasions sent for negatives, offering a fair sum for the loan; but no sooner was the photographer aware that enlargements were wanted than he hied away to the party to see if he himself might not be able to secure the order. This has happened so often to me that I really don't care to write for the loan of a negative at all unless I know my man very well—I just content myself with copying the *carte*."

"Yet you know," Jack said, "it does seem 'hard lines' for the original holder of a negative to lose the orders for large work, does'nt it?"

"Yes, but in the usual run of trade it is not a thing that can be obviated; for in many cases the party wishing the large picture only holds a *carte*, is a client of yours, and knows nothing of the original photographer at all, and, even suppose he did know, would not go past you for his work, being pleased with what he has had from you before."

"That's so," I replied. "I have had clients again and again possessing *cartes* only who would not go to the holder of the original negative, and of course I would rather do my best with them, if the negatives were not to be had, than acknowledge that it was out of my power to produce the best results, and so the holder of the original negative does not get benefited in the least; but if this half-sovereign arrangement was entered into he would at least pay himself for the keeping of it on his shelves."

And so we came to the conclusion that it would be well for the trade if a society were started all over the United Kingdom, the aim and object of which would be the giving and receiving negatives on loan when required for enlarging purposes; ten shillings, or any other sum specified by the society, to be be paid for such loan to the party holding the negative. Negatives of celebrities, or for commercial purposes, not to be included—only usual negatives of ordinary customers. It should be understood that the party applied to for the negative would not use any influence to obtain the order for himself. Under these or similar conditions the privilege would be enjoyed by all the members of such society alike, and would wrong no one, but might be the means of returning some little to pay for the keeping of negatives in many cases where there is no return now. It is worth a thought. MARK OUTE.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 1	West Riding of Yorkshire	Oddfellows' Hall, Bradford.
,, 3	Edinburgh	Hall, 5, St. Andrew-square.
,, 3	Bristol and W. of Eng. Amateur	Museum, Queen's Road.
,, 3	Photographers' Benevolent	160a, Aldersgate Street.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

THE above Society held an ordinary meeting on the 26th April,—Dr. Vogel occupying the chair.

After two new members had been admitted,

The Chairman referred in a few words to the death of Herr von Voigtländer, and the whole assembly rose to its feet to testify its respect for the memory of the deceased.

A communication from Herren Strumper and Co., of Hamburg, on the marks observed by Herr Schahl in drawn off negatives was then read. [See report of meeting of 15th February, page 188.] It ran as follows :—

"As we are in the daily habit of drawing off negatives by means of gelatine, and as we were formerly a good deal troubled by negatives spoilt by the spots spoken of by Herr Schahl, we thought our four years' experience in this matter might have some interest for others.

"In our opinion these spots are induced by unequal drying, or rather by an inequality in the temperature of the drying place. Why an unequal temperature should have such an effect upon the gelatinised negative we have certainly not yet been able to find out; but as we have generally been able to ascertain that a change had taken place in the temperature of the room in question, which cooled down considerably in the course of the night, and as the plates left to dry during the night showed these spots oftenest, and those gelatined in the morning and dried before evening showed them seldom, we thought that the fault must lie in the gelatine, the glycerine, or in the negative itself.

"We then placed the negatives, after coating them with gelatine, in our drying-box, and, keeping the lid open, we raised the temperature by gas to about 30° R., and in this way we have been able to avoid the spots as long as the warmth was equal and sufficient.

"But when the negatives were placed in the drying-box in the evening they were sometimes not quite dry next morning, owing to the pressure of gas being less during the night than in the daytime, and thus allowing the temperature to fall below 30°. In this case spots often made their appearance, as well as in plates which were carried, even for a short time, into another room while still scarcely dry.

"We, therefore, believe that the best way of avoiding these spots is to dry the gelatinised negatives at an equal temperature, and as much as possible in a place free from draughts and changes of air (preferably in a drying-box, with the lid open). Too rapid drying should be avoided, as it makes the gelatine film spring off.

"We shall have much interest in hearing the experience of others in this matter, should our communication lead them to further experiments towards clearing it up."

Herr SCHAHL admitted that his experiments had not been always made at an equal temperature, as he had not thought it of great importance. He therefore admitted the probability of Herren Strumper and Co.'s explanation. He (Herr Schahl), however, remarked that he had got fewer spots when using an inferior sort of gelatine.

The CHAIRMAN recommended Johnson's method of drawing off negatives.

Herr Obernetter stated in a letter to the Society that his method of reversing the negative process had produced good results in the hands of Prince Lobkowitz, but that the latter recommended that the iodide and bromide of potassium baths be slightly acidulated with nitric acid. He had also tried to increase the quantity of silver in the silver collodion, but had found it was easily thrown off on the addition of the ether.

A series of "imperial" pictures by Mr. Rocher, of Chicago, was then laid on the table, along with a novelty in applied photography shown by Herr Prümm. The latter was the *menu* of a marriage feast decorated with the portraits of the bride and bridegroom.

The subject of the Berlin exhibition of 1879 was then introduced, and the CHAIRMAN said he did not know where the photographic apparatus would be placed. The meeting was of opinion that the best plan would be to place the photographs and photographic articles by themselves. As yet twenty firms or individuals connected with the Society have announced their intention of exhibiting.

Herr SCHNEIDER offered to supply the mounts for all the photographs exhibited by members of the Society on condition that his name might be placed in small print on the said mounts.

His offer was gladly accepted, as it would add materially to the uniformity of the whole exhibition.

The CHAIRMAN then showed Volhardt's volumetric method of analysing silver. This process is adapted to the exact determination of the silver contents of photographic baths, and is manipulated like Vogel's silver test. The same burette and pipette are used as with the latter, but sulphocyanide of ammonia is used as the standard solution instead of the potassic iodide solution. The Chairman, in the course of his explanations [*ante*, page 281], said that, as the preparation of the sulphocyanide solution might be found troublesome by those photographers who were not also chemists, it might be as well if a solution of the proper proportions were to be bought already prepared. The great advantage of this process over Vogel's was that only one fluid (the salt of iron oxide) was required as "indicator," while by Vogel's method two fluids (the fresh solution of starch and nitrous acid) were necessary. On the other hand, the blue colour of Vogel's test, being complementary to the yellow of the iodide of silver, was much more distinct than the yellow of the sulphocyanide of iron.

Herr PRÜMM, in moving the thanks of the meeting to the Chairman, said that they all understood the process very much better from having seen the experiments than they had done from the mere reading an account of it.

Herr RICHTER thought Vogel's test with iodide of potassium and starch much the most practical, as the iodide of potassium solution was quite stable, which could not be said of the sulphocyanide of potassium solution. As for the difficulties of the iodide of potassium test, in the hands of a moderately careful worker there were none.

The CHAIRMAN said that certainly iodide of potassium came into the market pure, so that one could easily prepare a solution of any desired strength, while sulphocyanide of potassium was generally impure and required to be tested. Still, he had not as yet observed any decomposition of the testing fluid.

Herr KUNZE wished for some information with respect to the treatment of a collodion which, when poured upon a plate, dries so unequally that it still remains fluid at the side where it was poured off, when the opposite side has already become horn-dry.

Herr Halwas thought the cottonmust be at fault, and no one could suggest any other remedy than using other cotton.

The Secretary then concluded the business of the evening by presenting his annual report, which concluded, by request, with the eight stanzas composed by Herr Linde, and sung by him at the last *conversazione* of the Society in March.

The meeting was shortly afterwards adjourned.

THE PHOTOGRAPHIC SECTION OF THE AMERICAN INSTITUTE.

At the March meeting the President, Mr. H. J. Newton, occupied the chair.

Dr. Higgins said : I have various specimens to present to the Section illustrative of emulsion photography. The photograph now shown is one which I placed upon my easel and have brought with me so that the Section can judge of the negative taken therefrom. It is a photograph of the interior of the Tribunal of Commerce, Paris, and possesses every possible variety, almost, of light and shade. (Exhibiting negatives from photograph.) That is the photograph from which I took this negative. I made use of it by reason of its difficult character. It is a small, quarter-plate negative with moderate development. I pushed that development much farther than necessary to show the intensity which is obtainable in the emulsion process. I then took a large negative for the purpose of obtaining a print therefrom, which I now exhibit. I also exhibit the print obtained from the negative, so that it can be compared with the original. The development in both cases was simple alkaline development—alkaline pyro.—and much weaker than ordinarily used. The President's formula for alkaline development is, I believe, bromide of ammonium, forty grains; sal soda, two ounces; water, one pint. The developer which I use is bromide of ammonium, eighty grains; sal soda, one ounce; water, one pint. I have of late combined with that one drachm of honey to the pint. Such is the developer I use—twice as weak as the President's in alkaline, and twice as strong in the restraining agency of bromide; and this I almost always dilute one-half with water. I exhibit also a second negative taken by the emulsion process, *The Marriage Ceremony*, by Raphael, and the print therefrom. I am not positive whether the print was on toned or white paper. I also exhibit a positive made by the emulsion process upon a preserved plate. The three former negatives were wet plates. This is a preserved dry plate, and the positive was obtained by contact with the negative and placed in opposition to the gas light, an exposure of one second exactly being given. In order to facilitate the matter by counting true seconds I erected a pendulum of a proper length for the latitude of 45°, which is $993\frac{52}{100}$ millimeters, or, in English measurement, $3\frac{2616}{10000}$ feet (approximating very nearly to 40 inches), to oscillate in exactly one second. I also exhibit a second negative taken by contact—a dry preserved plate transparency with ground glass backing—held one foot from an ordinary four-foot gas burner. That is a dry emulsion plate, showing that preserved plates can be made fully equal in rapidity to bath plates. Outdoor photography is another branch. I have no particular specimens to exhibit in that line, except the mere matter of showing the time of emulsion photography as compared with that of bath-plate photography. The negative exhibited is on a preserved dry plate take with a Voigtlander lens of eleven-inch focus; size of aperture in diaphragm, $11\frac{1}{2}$ millimeters, representing $\frac{f}{24}$. There are four different exposures on that plate, each of five seconds; the third, of fifteen seconds, seems evidently to be the full exposure. The next plate was taken with a Morrison lens (which I would take occasion to most highly praise for its very valuable character of depth of focus, which it seems to possess in an extraordinary degree), eight-inch focus, taken with the third opening; size of aperture of diaphragm seven millimetres, representing $\frac{f}{30}$—four equal exposures on same plate, fifteen seconds for each. I have not the negative, but I have the print of an outside view taken with a similar eight-inch Morrison lens in thirty seconds at half-past three o'clock p.m.; size of aperture in diaphragm nine millimetres, representing $\frac{f}{22\frac{1}{4}}$. All the plates had been prepared over three weeks. I am in the habit of using dry plates that have been prepared three or four months with the same certainty. In this case I developed them immediately after exposure; but I have frequently developed them after two weeks.

The President : You stated you use a drachm of honey in a pint of water with your ounce of alkaline or sal soda—that is, in all these, the wet and the dry?

Dr. Higgins : Universally.

The President : What is the immediate effect of the honey?

Dr. Higgins : The reasons for its use are two—one being that I find much greater intensity of result; the other, in cases where a long exposure is required, honey in the developer prevents it drying nearly as readily as without it.

The Secretary : It does not prevent the plate drying, does it? It may prevent it exhibiting traces of the drying on the developed image, as it otherwise might do.

Dr. Higgins : I am glad you corrected me, as it makes me state what I have neglected to do. It is an absolute fact that, in the use of the emulsion wet plate, if previous to exposure you flow that plate with your alkaline developer minus the pyro., which afterwards you put in, that you will accelerate the action of the light upon the plate from one-half to two-thirds. I have tried the experiment over and over again. Our President will, I think, corroborate my statement in so far as it relates to the accelerating influence when applied to the plate previous to exposure. I always flow my alkaline developer containing the honey over the plate *before* exposure in the camera; it both adds to the intensity and prevents the developer flowing unevenly over the surface. I use the same developer immediately after exposure with the pyro. added.

The Secretary : I observe here one feature always noticeable—in making a reduced copy, as Dr. Huggins has of this *Interior of the Tribunal of Commerce*—the shadows, or the dark portions, always appear darker in proportion to the reduced copy than in the large picture, from the fact that in the large picture we have very small points of light in the shaded parts, which give to the shadows transparency. When we reduce those points of light they become so small that we do not see them, and the shadows appear more dense.

Mr. Chapman : I think that that transparency—the one that is mounted without any varnish on it—shows a perfect freedom from granulation, which a silver bath always has; and that was the first thing that attracted my attention, in commencing with the bromide plate, as being of very great importance in transparencies. In using a film composed of iodide of silver there is always a deposit of silver on the surface. No matter how clean the work may be it is impossible to prevent the silver precipitating on the shadows at the same time it is depositing on the high lights of the negative, and the same occurs in making a positive on an iodide of silver film. The only really good way to make transparencies is with bromide plates, and developing them with an alkaline developer; then you will have no deposits.

The President : Dr. Higgins, were the plates merely washed and dried, or was there a preservative or organifier put on them?

Dr. Higgins : The dry plates were, after being flowed, very thoroughly washed through four or five changes of water, and then organified with an ordinary organifier or preservative.

The President : If there is nothing further to communicate on the emulsion question, Mr. Bierstadt has some interesting experiments to relate in reference to the action of light.

Mr. Bierstadt : I have been trying experiments to see what colours I could photograph and what I could not. I prepared a piece of paper with the seven colours of the spectrum, as nearly as I could get them. I photographed that strip over one hundred times, and have made prints from over seventy of these negatives. I wanted to see if I could make any other colours appear white on the print, as well as we do the blue, and I wanted to see if we could make blue black. I succeeded. I succeeded in making green a light, and yellow quite a light, colour. I have not yet made red white. I have here a number of examples (exhibiting). I worked through blue glass—through glass of all colours that I could grind sufficiently true to allow me to bring the image of my object in focus. I had coloured glass ground until I exhausted all the bright colours I could get; then I made a cell of two thicknesses of glass and placed a rubber ring round it, and filled it with different fluids of different colours. The same colours do not always produce the same results; and different kinds of aniline dyes, different kinds of minerals, all seem to produce different results (exhibiting many prints, with number, description, and explanation on each). I was told that I could not photograph anything through a cell of bisulphide of carbon with iodine dissolved in it, as it cuts off all the light and lets through all the heat. I made such a cell, tinted with iodine, until I could not see the image on the focussing glass at all, and yet photographed it perfectly. In fact, I believe, instead of cutting off, it accelerates, because among those trials there was one that required twelve minutes' exposure. It was with a cell containing aldehyde green—an aniline colour. I used a cell of this bisulphide of carbon *with* the cell of aldehyde green, made an exposure in four and a-half minutes, and you here see the result.

The Secretary : Mr. Bierstadt's remarks about the characteristics of bisulphide of carbon call to mind some remarks which may be found in *Tyndall's Excursions in the Alps*. The excursions were made somewhere about twenty-five years ago. In the second part of that work may be found a discussion upon the nature of light, and he speaks of some experiments upon the actinism of light passed through certain media, and also speaks of peculiar action when the light is passed through fluid containing no oxygen. Bisulphide of carbon, of course, contains, if pure, no oxygen; and he mentions that it would be interesting—but he does not say he has tried the experiment—to utilise several other fluids, and one particularly named by him is chloride of phosphorus. This is not a very common chemical, and one somewhat dangerous to handle; but I think if Mr. Bierstadt should continue his experiments it might be worth while to try it.

The President : In this experiment which produced more photographic action upon the green than the blue, what was the appearance of the image on the ground glass?

Mr. Bierstadt : The green appeared much lighter than the blue.

The President : It made it look white?

Mr. Bierstadt : If you take a deep red cell and look through it you will make the blue end of this object sheet very dark, very black; the other end will be quite light. If you look through a blue cell it will be quite the reverse.

The President: In connection with the cell that made the green photograph white, what was the colour of the blue adjoining?

Mr. Bierstadt: The blue was nearly black—a very strong contrast between the two.

The President: Mr. Chapman promulgated a theory, when Mr. Chisholm's blue glass experiments were under discussion, that the light from the object being photographed in passing through a coloured medium did not change in actinic force; the wave length of the light that comes from the object being photographed was not changed. I do not see how they can be reconciled with these experiments.

Mr. Chapman: There is nothing inconsistent with it, I am sure. He stated he made a longer exposure.

Mr. Bierstadt: It would take longer exposure if the light was passed through blue glass than without any glass.

The President: The point is here: is there any gain by the interposition of coloured media through which to pass the light in photographing the green? In all these exposures or in these experiments, where the green shows more actinism than the blue, such seems to be the case.

Mr. Bierstadt: I have not found any increase of actinic force by the use of coloured media.

The proceedings then terminated.

Correspondence.

FERROUS OXALATE DEVELOPER.

To the Editors.

Gentlemen,—Many photographers will be trying this new and simple developer, and any remarks even on what has resulted from failures may prove acceptable.

My first trials were with Swan's new plates, which, for rapidity, cleanliness, freedom from spots or stains, and ease of manipulation, leave little to be desired, and to the inexperienced amateur must prove a great boon.

But the instructions given are, I think, inclined to mislead. I prepared, according to them, a pint of solution, and my first developed negative gave me a very good opinion of the developer; the advantage, however, of occasionally moving the bath was made apparent by the sky being thin, owing, doubtless, to that part having exhausted the power of the solution in its immediate vicinity. The next negative, left in the developer for fifteen minutes, hardly showed a trace of an image; but, after rather more than an hour, a weak picture resulted. This I put down to under-exposure. But my next plate, to which I purposely gave a full exposure, refused to show any trace of an image. After one hour's immersion I took it out and placed it in the sun's rays, and again in the developer. After another hour still the same as when taken from the slide. I thought I must by some blunder have not exposed the plate at all. The next trial gave no formation of an image after two hours' immersion. I then added (not even filtering, as I expected no further result) a pinch of the ferrous powder, and left the plate in the solution for a couple of hours—in fact, I forgot it. My astonishment was great at finding an excellent negative as the result.

From these failures I gather that it is best only to mix what solution you are likely to use in a day, as it loses all its developing powers in a very short time, or to revive it with an occasional pinch of oxalate of iron, this being contrary to what I had learned on the subject.—I am, yours, &c., Walter B. Woodbury.

Manor House, South Norwood, June 24, 1878.

FILTERING SILVER SOLUTIONS.

To the Editors.

Gentlemen,—I was much interested in the description given by the "Peripatetic Photographer" of his method of filtering, and have lost no time in constructing an apparatus of a form similar to the one he described; but, as it differs from his in one or two minor details, permit me to give an account of it.

The glass jar which I have procured for my cistern, if I may so speak of it, is of a square shape, with a wide, round neck, its capacity being six pints. I prefer the square form on account of its occupying the least space; for as the nature of my business avocations leads me to travel a good deal it is of some importance that my camera (18 × 16) and other appliances should be packed in the smallest space convenient. The bung or stopper is made of boxwood, round which is an india-rubber ring half-an-inch in width, which ensures so good a fit that not a drop can leak out, even if the bottle be carried upside down. The funnel, which in the "Peripatetic's" filter is of glass, is in my apparatus made of ebonite, and I have it firmly cemented into the boxwood cover, the hole or nozzle of the funnel being screwed inside, so as to hold a stopper, also of ebonite, which screws in and renders this part quite water-tight.

The filter proper is, like the funnel, formed of ebonite, and consists of a piece not much unlike, both in form and dimensions, the leather cap of a small *carte* lens, there being a hole in the centre into which is fixed the end of a piece of pure, black india-rubber tubing. The mouth of the filter is covered with two thicknesses of white calico of close texture, and it is allowed to hang suspended in the reservoir to within three-quarters of an inch of the bottom. The portion that passes through the hole in the cover of the reservoir is cemented to it, which is very advantageous, inasmuch as it enables me, when I wish to start the action of the syphon, to do so by simply inclining the bottle on its side and pouring out the solution through the rubber tube, and by thus starting the outflow of the silver it will continue to run until all that is required has been removed from the bottle. This entirely supersedes the awkward and somewhat dangerous method of applying suction by the mouth.

From the brief experience I have had of this filter I like it very much, and should be sorry to be deprived of it. I would have preferred the use of felt to calico as a filtering medium, but there was none to be had in the locality in which I had my filter constructed.—I am, yours, &c., Ajax.

June 24, 1878.

NATURE *VERSUS* ART.

To the Editors.

Gentlemen,—Journeying with my camera in the neighbourhood of Killarney, some years ago, I met such a pretty girl—an Irish girl, of course—with unkempt locks, and a costume which had once, perhaps, been a gown, but, owing to the dilapidations wrought by time and weather, now barely afforded a decent covering, and displayed legs which would have startled the Lord Chamberlain. Being then (as now, for "age cannot wither me") extremely susceptible to female loveliness, I was anxious to obtain her for a model, and, with some difficulty, surmounted by the help of the universally-potent talisman, succeeded in persuading her and a younger sister to call at my quarters next morning to be "took;" or, rather, my sister, who accompanied me, persuaded her, which I mention in order that your modest readers may be assured that everything was quite proper. There was a romantic stream of water just behind the house, and I went home rejoicing, and dreamed all night of the charming pictures which could be composed out of such promising materials.

In the morning my models duly made their appearance; but, oh! horror! I beheld two commonplace-looking girls decked out in their "Sunday's best," including shoes and stockings, and in whom I quite failed to recognise my little dilapidated fairies of the day before. What was to be done? I had never thought of such a transformation. It was an early experience of the Irish peasantry, and I could not very well ask two young ladies to modify their costume in accordance with my ideas. All I could do was to get off the shoes and stockings and extemporise some sort of hood for the head. Perhaps you know the pretty way those Irish girls have of turning a shawl, a skirt, or anything into a hood. But, after all, how different from my dreams! What comparatively ugly and ungainly figures, as peasants always are when in their best clothes!

And let my fair readers, if any, take warning and remember that they are not always most attractive when decked out in their "war paint and feathers;" although, on the other hand, they need not (chiefly on account of Mrs. Grundy) attempt to dress with the extreme simplicity of the heroine of my tale.

Moral: "Never put off till tomorrow what can be done today."—I am, yours, &c.. R. S.

June 25, 1878.

[The specimens enclosed with the above letter testify to what can be done by the tourist photographer in the way of "character" pictures, and cause us to regret that "the girl" proved such a failure. —Eds.]

Venus and Adonis.—"Men who suffer their wives' photographs to be exhibited for sale in the shop windows run the risk of being thought to get some profit by so doing, for they otherwise would hardly sanction such publicity."

Where are you going to, my pretty maid?
I'm going to be photographed, sir, she said.

May I go with you, my pretty maid?
Yes, if you like it, she calmly said.

What is your fortune, my pretty maid?
My face is my fortune, sir, she said.

How do you live on't, my pretty maid?
By selling my photos, she promptly said.

Then may I marry you, my pretty maid?
If you've a title, perhaps—she said.

—*Punch.*

EXCHANGE COLUMN.

A strong ash tripod camera-stand with brass top will be given in exchange for a 10 × 8 bath.—Address, H. Buttrum, Wolverton-road, Stony Stratford.

I wish to exchange twenty dozen fine American assorted stereoscopic slides for an equal number of good English ones.—Address, A. Downing, Aldeburgh, Suffolk.

Wanted, a Ross or Dallmeyer *carte-de-visite* lens, in exchange for a burnisher, best albumen paper, printing press and type.—Address, "Photographer," Grove-terrace, Victoria Park, London.

Stereo. camera for plates $6\frac{1}{4} \times 3\frac{1}{4}$, with dark slide, changing-box, lens by Jamin, in good condition, will be exchanged for a portable tripod-stand. Value adjusted in cash.—Address, F. C., 55, Bold-street, Liverpool.

Offers in exchange wanted for a ten-inch square Kinnear's camera, by Meagher, with Dallmeyer's No. 3. triplet lens; all equal to new. Also, a No. 5 Dallmeyer's triplet and a No. 1 triplet.—Address, Arthur Maddison, artist, Huntingdon.

Wanted to exchange, an improved burnisher, fitted with gas burner, for *carte* or cabinet pictures (quite new), for camera with bellows body and several dark slides. Particulars per post.—Address, G. A. Hayward, St. Giles'-street, Northampton.

ANSWERS TO CORRESPONDENTS.

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

J. Houghton (Leeds).—Received. A private reply will be sent in a few days.

N. V. S.—Thanks; but at present we cannot avail ourselves of your offer. In a few months hence we may.

F. Sinclair.—A plano-*concave*, not a plano-convex, is required. You must have misunderstood the optician.

Jacopo.—In papering the walls of your new studio avoid paper of a dark colour. A light grey is best, but there should be no decided pattern impressed upon it.

S. O. J.—We quite well recollect the statement, which was controverted at the time, and very properly so, for ferns *do* grow close up to the margin of the sea. The other matter was quite correctly stated.

G. Allen.—The only work on the subject which we can at present call to mind is published by Mr. J. Newman, of Soho-square. An application to that gentleman will, no doubt, ensure your requirements being satisfied.

D. W. H.—Notwithstanding the number and variety of the methods of preparing oxygen that have been proposed there is no method which, for small consumers, is so good as that by means of chlorate of potash and peroxide of manganese.

A Brixtonian.—In several shop windows you will see Japanese trays of fanciful designs. Select one of the plainest that is nearly of the dimensions of your plates, and try it. We have succeeded when using them, and there is no reason why you should fail.

Tyro.—There is no discrepancy. The temperature given is evidently that indicated by the Celsius or centigrade scale, and hence the hundred degrees of temperature mentioned is in reality equal to that at which water boils, or 212° Fahrenheit—the scale made use of in this country.

W. Weston.—Thanks for the specimens of "self-developed" plates; though not technically perfect they bear evidence to the practical nature of the process. The remaining specimens are creditable as instances of photography under difficulties, but would scarcely rank as first-class work.

B. Esselment.—Although we have never seen a portable tent formed of bamboo, we have heard of several instances in which bamboo canes have been utilised for that purpose, and it is said that, owing to their lightness and rigidity, they answer most admirably as the framework of a tent.

Two Occasional Readers.—Seeing that the plates were prepared with a view to their being utilised within one or, at most, two months afterwards, it is not matter for surprise that you should not get an image after keeping them for three years. Read the articles on this subject which have recently appeared in this Journal.

Geo. Lindsay.—We do not know by what formula the maker named prepares his retouching varnish, nor would it be greatly for the benefit of our readers to learn; because the manufacture of varnish, like that of collodion, is best conducted on a large scale, and by a person who has acquired experience in that branch of manufacture.

B. W.—1. A plano-convex achromatic lens of the kind specified may be purchased for twelve shillings. We do not think it will answer the intended purpose as well as one of a more meniscus form.—2. The lens mentioned is a triple cemented compound, and is much superior to that composed of two elements. This matter we have determined from actual comparative tests.

Jacques.—To obtain opal glass plates two by two and a-half feet it will, we imagine, be necessary that you have it made expressly, as we are not aware of its being sold in plates of such dimensions. Any dealer in photographic materials will, however, be able to answer the question. In reply to the other query: we are rather averse to entertaining the proposal.

J. P.—It is, as we have frequently stated, contrary to our custom to recommend any particular form or make of lens as better than another. The reason for our taking such course you will readily comprehend. You will be perfectly safe in applying to any one of our first-class opticians and abiding by his advice. The same remarks apply to your second query. You will have no difficulty in finding what you want in our advertising columns.

R. C.—You do not rightly apprehend the function of the microscope, for it is quite indispensable to the student of science. But you also make a mistake in associating a microscope with considerable pecuniary expenditure, whereas—although it is quite true that some instruments of this kind are very costly—the cost of one that will quite satisfy all the requirements of that branch of study upon which you have entered will not exceed twelve or fifteen shillings. A compound microscope is not required.

Photolitho.—Intensify either by the chloride of copper or the bromide of copper process. In this way you will be able to obtain density of the greatest degree without any danger of the fine lines becoming filled up.

O.—We should be very happy, did our arrangements permit, to undertake the task of testing the plates as you suggest; but, for some time to come at least, we shall be unable to do so. Our experience with that particular class of plate, moreover, is comparatively limited, and we should scarcely consider the result of our trials as conclusive in the event of their proving no more successful than your own. From your description of the development we should be inclined to lay the blame upon an over-dose of ammonia.

Tourist.—The plans you propose adopting are excellent, and with your companion, whom we know to be one of the most genial of men, you cannot fail to have an exceedingly enjoyable trip. You do not seem to be aware that much of the ground you intend to cover has been gone over by Mr. O. R. Green, who, in our Almanac for 1876, and subsequently in an article entitled *A Run for Sunshine*, described his adventures with a camera in Egypt, Rome, and other localities. We strongly advise you to peruse the articles to which we have referred previous to taking your departure from home.

F. R. S.—We are only too well aware of the fact that the stains on the hands, arising from the use of alkaline pyro., are far more difficult to remove than those caused by the use of acid pyro. and silver. It has been recommended to employ a solution of bichloride of mercury, to which have been added a few drops of hydrochloric acid and a little common salt. It is scarcely necessary to say that, after the application of this mixture, it will be requisite to wash the hands thoroughly. We find that friction with a piece of pumice stone, using hot water and soap, removes the stains in an effectual manner.

Geo. Wingate.—We cannot offer any advice under such circumstances. The name of a certain manufacturer of collodion upon one or more bottles does not necessarily prove the collodion to have been manufactured by such maker any more than the fact of his label being on the bottle would do so. It is easy for an unscrupulous individual to fill a number of empty collodion bottles with a sample different in quality from their original contents, and then to sell them as genuine; but to *prove* the accomplishment of such a fraud would be an exceedingly difficult matter. You had better submit a sample to the reputed maker, who will, at any rate, offer an opinion as to its genuineness.

Rev. J. Scott.—The French chalk best adapted for causing the collodion film to adhere to glass plates is that which is made use of so extensively by bootmakers and glovers for dusting the insides of their respective productions in order to make them slip on with facility. By inquiring for "powdered French chalk" no difficulty in obtaining a large supply will be experienced. The method of using it is, first of all, to clean the plate, and then to sprinkle on the surface a little of the powder, making use of a rubber to spread it. The superfluous powder must then be removed by *lightly* rubbing with a wash-leather. In most cases this renders quite unnecessary the employment of a substratum, especially with plates of small dimensions, by which we here mean those of 8 × 5 and under.

George S. Haley.—If you are "handy with the tools" it will not cause a great deal of trouble to fit your lens with Waterhouse diaphragms. First of all mark on the jacket the portion it is desirable to cut out, and then by means of a circular saw of very small diameter let the piece be cut out as far as that can be done by such an instrument. It will not, perhaps, be sawn up to the corners, but this can be effected by means of a small straight saw. If you have not a lathe drill a row of holes all round the portion marked on the jacket, and then break out the piece. Finish the edges with a file and emery paper, and then cut the slit in the tube, using for that purpose a rigid saw. Two annular pieces of brass inserted in the tube, one at each side of the slit, complete the operation. Do not cumber yourself by making too many diaphragms.

X. Y. Z.—Make use of a large wooden tray coated inside, first, with lac varnish, and then with a mixture of wax and paraffine. The dimensions of the tray may be about four feet by three feet. It must be fitted to a table-stand in such a manner as to be suspended on stout pivots projecting from the sides, and a heavy pendulum must be attached it so as to impart an oscillating motion. To use the tray fill it half-full of water, and, having coated the plates one after the other, lay them down in order, in the tray, which will hold two dozen of the size you indicate, and when all have been properly placed impart a slight degree of motion to the pendulum. By doing this a gentle tilting to and fro will be given to the tray, which may be continued, with several changes of water, until the whole of the soluble bromide has been removed. There are numerous details connected with this which will suggest themselves.

Received.—E. Dunmore; J. Nicol, Ph.D.; "Gloaming Time;" E. O. P.; "Medicus;" and W. S. Hay.

CONTENTS.

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ON THE DETERMINATION OF SPECIFIC GRAVITY.

A knowledge of the "strength" of various liquids and solutions employed in different branches of photography is frequently of the greatest importance, and a ready means of acquiring the needful information should be at hand in every photographic studio as it is in the laboratory of the chemist. But too many of the followers of our art are content, if they give a thought to the matter at all, to accept as correct the *reputed* strength of the materials obtained commercially, and in the matter of solutions in constant use (the negative and printing baths, for instance) they work a "rule of thumb" mode of calculating or guessing at the extent to which the solutions are deteriorated by use.

Under such circumstances it is not surprising that serious difficulties not unfrequently arise, and in the latter case the photographer has no one but himself to blame; but in the case of liquids such as alcohol, ether, nitric or sulphuric acids, which for certain purposes require that the strength or specific gravity be accurately known, the chemist is oftentimes unjustly blamed when it is accidentally discovered that the quality is not such as had been supposed. The whole of these substances are liable to rapid deterioration if badly or carelessly stored; indeed, even when the utmost precautions are adopted, it is almost impossible to preserve anhydrous alcohol and ether or the most concentrated acids in the same state as when freshly prepared. The photographer, then, is almost equally blameworthy if, by neglecting to examine his materials, he incur failure from this cause.

The methods by which the strength or quality of different liquids may be arrived at vary according to the nature of the substance to be examined. In the case of saline solutions the most convenient method is to proceed by quantitative analysis, though if a table of densities can be procured the determination of the specific gravity is sufficient, provided the solution is known to be pure. But, as has often been pointed out, the application of the specific gravity test to such solutions as a negative bath which has been much worked is worse than useless, as the salts introduced into it by the decomposition of the soluble haloids in the collodion entirely upset the calculation; hence the "argentometer" is to be avoided. In estimating the strength of acids the chemist usually adopts the process known as *acidimetry*, in which the result is obtained by ascertaining the number of measures of a standard solution of alkali a given quantity of the acid is capable of neutralising. For nitric and sulphuric acids, however, which are the only ones that require to be estimated to a nicety, the determination of the specific gravity answers equally as well, and the operation is much more easily performed. For ether and alcohol the specific gravity test is the only one available.

Very few of our readers, we imagine, require to be told that the specific gravity of a substance is the weight of a given bulk of it at 62° Fahrenheit as compared with an equal bulk of some other substance which is reckoned as unity. Distilled water is universally adopted as the standard for liquids and solids, merely on account of its uniform composition and the fact that it is always at hand or readily obtainable. At present we are not concerned in the specific gravity of solids, and shall, therefore, confine ourselves to a description of the various methods in vogue for determining the density of liquids such as fall within the experience of photographers, though it may be remarked that the same means are equally available to every description of liquid, whether it be a simple substance or a solution, and either heavier or lighter than water.

For many purposes connected with the arts and manufactures the result is attained by means of an instrument commonly known as the hydrometer, of which there are several forms, differing slightly in construction but identical in principle, which will be familiar to most of our readers in the "argentometer." These are chiefly useful in testing spirits, oils, saccharine solutions, and other liquids, the commercial value of which depends to a great extent upon their specific gravity, but are not so well adapted to the purposes of the chemist. The latter proceeds by ascertaining the actual weight of a known volume of the substance to be examined, from which the specific gravity is obtained by simply dividing the result by the weight of the same bulk of distilled water, each of the liquids being weighed at the standard temperature of 62°.

The instrument employed for this purpose is called a "specific gravity bottle," and consists in its simplest form of a thin glass bottle or flask with a somewhat long and narrow neck, and of such capacity that when filled to a point in the neck (at which a scratch is made with a diamond or fine file) it shall contain a known weight of distilled water at the standard temperature. More delicate instruments are provided with an accurately-fitting glass stopper, through which is drilled a small hole, so that when the bottle is filled with liquid and the stopper inserted any excess will escape by the perforation, and the contents be always invariable in volume. A further refinement consists in the addition of a small thermometer, forming part of the stopper, for the purpose of noting variations in temperature in cases where the liquid cannot be conveniently raised or lowered to the standard of 62°. In very delicate experiments the chemist is frequently obliged to resort to special means which need not be described here.

The capacity of the specific gravity bottle is a matter of no importance, provided it be accurately determined, but, for the sake of convenience in saving subsequent calculation, one containing 1,000 grains is to be preferred. All that is necessary in that case after weighing the liquid is to point off three figures of the result as decimals, and the number thus obtained is the specific gravity required. Thus we find the weight of a sample of sulphuric acid to be 1845 grains; we mark off the last three figures, and we have s.g. 1·845. Or a sample of ether is found to weigh 720 grains; we place the decimal point before the first figure, thus—s.g. ·720. If a bottle of half the capacity be employed the final result is the same, but we have to divide the result by 500 (the weight of the same volume of water), or, which amounts to the same thing, consider the weight as a decimal number, and multiply by 2. So, with the same examples given above, we find the weights to be 922·5 grains and 360 grains respectively, and dividing by 500 we get s.g. 1·845 and s.g. ·720.

But even with the most perfect apparatus obtainable the result will be far from accurate if the item of temperature be disregarded, and it is here where we should expect those inexperienced in chemical manipulations to be most likely to fail. However, by adopting a slightly modified course, a result, which though perhaps not strictly accurate is sufficiently near for all photographic purposes, may be easily obtained. It consists in weighing the liquid to be examined and also the water at the same temperature (the normal temperature of the atmosphere, regardless of the standard), and working out the calculation with the figures thus obtained. It will be found very much easier to proceed in this manner than to produce the standard temperature and retain it throughout the operation, either in the cold of winter or in the tropical heat of last week.

In order to obtain as clearly as possible this assimilation of temperature, the specific gravity bottle should be filled with the liquid under examination, and plunged up to the neck in a vessel of rain water previously boiled and allowed to cool. After remaining a quarter of an hour or so the stopper is inserted, the surplus expelled, and the bottle carefully wiped and weighed. The s.g. bottle is then emptied of its contents, thoroughly rinsed at the tap, and refilled from the vessel in which it was previously immersed, and the second weight taken. Theoretically this plan is open to the objection that, as different liquids do not expand equally under variations of temperature, different results would be obtained in summer and winter with the same substance; but practically the error is so slight that for photographic purposes it may be wholly disregarded. An actual experiment performed during the recent very hot weather will demonstrate this.

We operated upon a sample of sulphuric ether, employing a specific gravity bottle of fifty grammes' capacity. The particular sample of ether we found by a recent trial, carefully conducted, at the standard temperature to register s.g. 725 (strictly speaking, a little more, perhaps ·7252). Under the conditions described above the weight of the ether was found to be 555 grains, and of the water 767 grains. Dividing the weight of the ether by that of water, we have $\frac{555}{767}$ = ·7236, or ·0016 below the true result—a difference which could scarcely be expected to cause any serious injury if totally disregarded. In like manner we found that a sample of so-called absolute alcohol showed a specific gravity of ·812, the real figures being a little higher. To show the result of disregarding the temperature—at least so far as concerns the ether—it may be noticed that the actual weight of water contained by the bottle at 62° is 771 7 grains, and adopting these figures the ether would show a s.g. of ·719.

In conclusion: those of our readers who wish to avoid the expense of a specific gravity bottle may construct a very efficient substitute at a small cost. Procure a narrow-necked, one-ounce, stoppered bottle (the "squat" shape will be the more convenient), and file a groove down one side of the stopper, so as to provide a means of escape for the surplus liquid. This may be filled with distilled water and weighed at 62°, or the absolute weight may be taken at each experiment as we have described. A counterpoise is easily made from a piece of lead or brass carefully filed down to the exact balance. In emulsion experiments, or in the manufacture of pyroxyline such an adjunct to the laboratory will be found of very great use, but especially so in the latter case. We recently had occasion to doubt the strength of some acids we had been using for that purpose, when we found the nitric to be s.g. 1·36 and the sulphuric s.g. 1·67, instead of, as reputed, 1·42 and 1·85 respectively—a sufficient difference to entirely alter the character of the pyroxyline made with them.

EXAGGERATION OF RELIEF.

A PERSON possessing only one eye has no adequate idea of the effect or value of distance. The faculty of estimating the nearness of one object compared with another situated in the same direction depends mainly upon a system of triangulation, in which both eyes of the observer form the base of a triangle the apex of which is the point under observation, the convergence or the parallelism of the optic axes serving as an insensible means of appreciating the relative distances of the objects observed. The longer the base of this triangle the more delicate will be the appreciation of these measurements; from which fact it will be correctly deduced that while a one-eyed person cannot estimate distances unless by the aid of aërial perspective, a person whose eyes are separated by a greater width than usual will have a more delicate perception of relative distances.

Before proceeding to speak of a certain photographic application of this principle we shall describe a little instrument by which the effect of distance is greatly increased and intensified, owing to its being the means of effecting a virtual separation of the eyes of the spectator. The construction of this instrument, we may premise, is within the reach of every reader who possesses a modicum of mechanical ability, while its utility for purposes of observation is undoubted.

It consists of a light piece of tube of a moderate degree of width, say two inches, the length being considerably in excess of the distance the eyes are situated apart. That with which we have experimented exceeds six inches in length. In one side of this tube are cut two round apertures equidistant from the centre, their diameters being a little under an inch; another pair of holes are cut on the opposite side of the tube, but one of each of them being situated as near to the end as possible, their diameters also being as large as the tube will admit of. If, while in this state, the eyes be directed to the eye-holes, nothing but the opposite interior of the tube would be seen; but, by means of a pair of small silvered-glass mirrors placed at an angle of forty-five degrees directly opposite the holes, the eyes become cognisant of such scenes or objects as happen to be situated at right angles to each of them, causing a confused appearance by the blending of the dissimilar scenes. But by means of a small mirror placed in each end of the tube opposite the outer aperture in the side, and having its plane quite parallel to that of the eyepiece mirrors, the view of nature that is presented by looking into the eye-apertures is precisely similar to what is seen by the unassisted eyes, subject, however, to this difference—that moderately near objects appear closer at hand, and distant objects more distant; in short, that the relative distances of objects from each other have become intensified or magnified. We have described the instrument in its simplest form, but it will be seen that by adopting a telescopic construction of the tube any desired degree of intensity or exaggeration may be imparted to the distances in the scene under examination.

Every photographer conversant with the use of the binocular camera knows that the wider apart the lenses are mounted on the camera the more pronounced will be the stereoscopic effect of the pictures taken under such conditions. There are certain subjects, however, which from their nature are not amenable to being taken with stereoscopic effect at all, unless under circumstances in which a departure from ordinary usage has taken place. Of this kind is the photographing of a coast line from the sea.

A few days ago it was our good fortune to be on board a quick-sailing yacht when, under a fair wind, she was making rapid progress within a mile of the coast of the island of Hoy, one of the Orkney group. To the eye the coast appeared uniformly even and monotonous; but from previous acquaintance with the scene we knew that this uniformity was only apparent, as the coast in reality was indented with creeks. To render apparent in a photograph these creeks with the accompanying headlands a stereoscopic camera seemed altogether inadequate; for, as no stereoscopic relief was visible to the eye, so neither would there be any in a binocular transcript of the scene. We, therefore, seized the opportunity of putting into practice something respecting which we have already thrown out a hint in these pages. Accordingly, having adapted to the camera a pair of quick-acting lenses fitted with shutters capable of rendering it easy to give an exposure the fractional part of a second, we placed an exceedingly-sensitive dry plate in the slide, directed the camera towards the coast, and exposed one half of the plate only. Having allowed the yacht to proceed several hundred yards, we exposed the second half. In accordance with the principle laid down in the former part of this article, the picture, when developed and examined in the stereoscope, showed ravines of great depth, the jutting headlands projecting forward with singular boldness, and the creeks retiring away inland. In short, we obtained not merely a relief which was altogether invisible to the eye, but which could not under any other circumstances than those described have been rendered visible. The value of this method of acquiring a knowledge of the contour of an unknown coast must be apparent.

By making use of the highly-sensitive emulsions now so easily made, or of the plates so readily procured, no difficulty will be experienced in the practice of photography aboard ship. If a rapidly-acting shutter be employed it will be found that, even when the vessel is subjected to sensible motion other than that of the smooth, onward, gliding motion of progress, a picture may be obtained satisfying all the requirements of, at least, artistic sharpness. We do not now allude to the facility of taking groups or scenes *on board of* the same ship on the deck of which the camera is planted, because in this latter case a prolonged exposure may be given without jeopardising the sharpness, seeing that both the subjects and the camera partake of the same kind of motion in common. The highly-sensitive gelatine plates, on the preparation of which such plain directions have recently appeared in the Journal, will prove exceedingly useful for such flying shots as we have here indicated.

RETOUCHING.

This article is intended to complete the short series on this important part of the production of a modern negative. The previous articles having treated of the materials to be made use of and the mode of obtaining a proper surface, we now describe the best method of setting to work.

The negative being placed on the frame, as described, the light should be regulated according to its density—the greater the density of the negative the stronger the light required—taking care always to use the lowest degree of illumination consistent with complete visibility of all detail and half-tone. If too strong a light be used the retouching will show more forcibly than appears in the negative, and would ruin its delicacy. The aperture in the retouching easel should not be too large, or there will be a flood of light running into the eyes that it will not only dazzle and tire them, but render the lighter and more delicate tones invisible. The plan we adopt is to have a sufficiently large aperture to see the greater part of a *carte* negative, for instance, and to diminish it while working by placing on the negative a piece of black cardboard in which a hole about an inch in diameter has been cut out. The pencil is to be pointed in the manner described, the final "sharpening" being best given by a piece of emery paper or cloth not too fine, a little care being necessary to avoid breaking the long and fine point. The easiest and surest mode is to work the point by repeated strokes away from the body, and not to rub it sideways or backwards and forwards. This hint will be found very useful, as the breaking of half-an-inch of point is very irritating. We have not had much experience with the "ever-pointed" leads we have alluded to, our preference being for the ordinary make of blacklead.

Our mode of practice is to take out of faces all freckles and marks, blotches of unequal colour, &c., first, and then very carefully to make the smallest possible amount of alteration in what is usually termed the "modelling"—that is, softening very heavy shadows and increasing the prominence of some of the leading lights. This is done by delicate "dabs," or dots, so to speak, with the point of the pencil, which must be made of the right intensity at once, as the depth cannot be increased by successive washes of colour, as in painting, though if the retouching be done in very fine dotting or stippling extra depth may be got by carefully filling in between the first pencillings.

The terms "stippling" and "hatching," as they are often employed, may be briefly described as dotting and lining respectively. When there are transparent parts requiring a considerable amount of intensity given to them it will be found next to impossible to do it at once, and then the only plan is to make the first retouching upon the *roughened varnish* as deep as possible, to soften by the aid of alcohol vapour, and then to heat strongly. This will fasten the retouching, and allow another coat of varnish, quickly applied, to be given. After the spots are all taken out by stippling the modelling may be done by hatching, making small lines only as regular in size and distance apart as possible, and as much as can be done causing them to follow the lines or contours of the features, or those particular facial developments that are being worked upon. It is important that the hatching should be done in a regular manner, or a very scratchy and uneven effect will be produced. Great care must be taken to avoid crossing the lines, or making two strokes touching one another, this being a fertile source of "lumpy" or "scratchy" work, as it is forcibly called.

It will be found of great use, if not an actual necessity, to have a magnifier for especially delicate work—not to be made use of from beginning to end, but merely for particular portions of the work, and to aid a general scanning of the whole when completed, so as to pick out any unevenness or roughness. If used all through it causes the work, strange as it may appear, to be less real and flesh-like and, we might almost say, less delicate. The glass should be of good width, so that both eyes can be used, and it is better if it can be affixed to a permanent support which will hold it at one distance from the negative; and this will materially lessen the fatigue of the eyes in using it.

The hatching may be suitably begun at the forehead and finished at the lower part of the face, working from the highest lights to the shadows, and not *vice versâ*. We do not intend to enter into a description of the anatomical development of the face, but, instead, we say go to nature. Every face will impart hints as to the leading lights and shadows under varying modes of illumination. A gentleman who was one of the earliest of retouchers in this country used to make a point of scrutinising his own face in a mirror, observing the disposition of high lights and shadows under every possible variety of illumination, and he recommends the method still as being better than all the books in the world. To the younger members of the profession we, apart from its entire desirability from other points of view, strongly recommend a study of drawing; the benefit would be great in many ways.

We conclude by pointing out some alterations which may be made or avoided with advantage. One of the commonest faults of a photograph is the stern or "cross" expression so frequently seen, which is caused by a too strong light, or it is the natural expression of a face at rest. One of the chief seats of this expression is between the eyebrows. It is not caused by the perpendicular line or lines, more or less pronounced, always seen there in persons somewhat advanced in life, but is produced by the contraction of the eyebrow, which at the end nearest the nose will be found, when under this expression, to have taken an angular form, and produced a decidedly darker shadow underneath in the orbit. If the corner of this angle be taken off, and the heavy, dark shadow be slightly lessened, the effect is at times almost magical; and yet any one can see, by looking at a retouched negative, that very few retouchers are aware of this simple expedient, it being generally thought that the upright furrows cause the frown.

It is generally advised to heighten the toning of the eyelids. We can only say, except to such experienced artists as need no advice from us, "do not touch them," for in ninety-nine cases out of a hundred the face gets spoiled by such work. That portion of the cheek nearest the nose should be most carefully and thoughtfully done; there is often a delicate shadow which is liable to be taken out by the unskilled retoucher with the effect of producing a swelled cheek. The line often found running down from the wings of the nostrils should be carefully lightened with the aid of the knowledge which would be obtained by a slight study of the artist's own face in a mirror. The difference between a smile and a sneer is caused by an almost imperceptible difference in the shading of this furrow that cannot be conveyed in words.

Finally: there is the corner of the mouth, where much may often be done if it be borne in mind that in a smile the corner of the lip is slightly turned up, and with a serious, grave, or crying expression it takes an opposite direction. The hands may often be improved by taking out the swollen veins they frequently present in the photograph, though often it happens that this can only be done on each individual print.

We think our instructions if attended to will be found to present nearly all it is necessary to learn—beyond what experience alone will teach—to enable any person to become a proficient retoucher.

A QUERY which we have answered this week in the proper column brings into prominence the fact that some considerable misconception exists in certain quarters upon the subject of filtration as applied to emulsions. Our readers are all aware of the care bestowed upon the filtration of collodion, and that special apparatus is necessary in order to avoid the evaporation of the volatile liquid during the tardy operation; but some, at least, among them err in supposing that an emulsion requires to be treated in the same manner as collodion. The nature of the two liquids is entirely different, collodion being a perfect solution, and emulsion, as its name implies, holding insoluble matter in suspension. Collodion, therefore, may be filtered through the closest material obtainable without suffering injury, whereas if an emulsion underwent the same treatment the result would be that a very small quantity of *pure collodion* would pass through the filter, the pores of which would soon become blocked by the minute particles of solid matter extracted from the collodion. The requirement in filtering an emulsion is entirely different from collodion; in the latter case, when we resort to such close filtration, we desire to remove the extremely minute particles of undissolved pyroxyline which rob the solution of its brightness. In the case of an emulsion, on the contrary, the object is merely to remove any accidental fragments of matter of comparatively large size which it may have acquired during the operation of sensitising, any closer filtration being performed previously. To effect this it suffices to run the emulsion rapidly through a plug of cotton or of sponge—an operation which, if applied to a dull collodion, would have not the slightest effect. A large plug loosely packed, it should be remembered, answers far better than a small one packed tightly, as the latter soon becomes choked with particles of bromide. For the same reason felt, unless very thin, is not to be recommended, except when employed in connection with an apparatus in which pressure is employed to force the particles of bromide through the fibres of the felt.

FURTHER NOTES ON THE WASHING OF EMULSIONS.

SINCE I wrote last week I have successfully carried out an experiment which has long occupied my mind, and which, by its result, seems to confirm my previous theory as to the cause of difference in the emulsion before and after washing. This difference lies chiefly in the varying degree of density obtainable under the two conditions, the image produced by the washed emulsion being generally, I may indeed say invariably, inferior in this respect to that given by the same emulsion unwashed. The inferiority I speak of is not always sufficiently marked to prove objectionable, but I have proved again and again that a washed emulsion capable of rendering a dense image without forcing has given still greater density previous to the performance of that operation.

The cause of this difference, which at first puzzled many of us, is now generally attributed to the removal of some important constituent of the emulsion simultaneously with the unevaporated solvents contained in the pellicle when first submitted to washing; and, in further explanation of the discrepancy between the effect of washing upon the film of a prepared plate and upon the mass of emulsion, it has been pointed out that in the latter case a much larger proportion of the solvents remain in the pores of the pellicle than is possible with an extremely thin film.

Accepting this theory as correct, the direct inference to be drawn from it is that by thoroughly removing the whole of the solvents before commencing to wash the cause of diminished density would be entirely removed. It will be remembered that my earliest instructions in washing the pellicle were to allow it to set very firmly before washing; while Mr. M. Carey Lea, on the other hand, recommended the water to be poured on as soon as the skin formed upon the surface of the layer of emulsion, and while the portion underneath was still fluid. These diametrically opposed plans are not necessarily anomalous if we take into consideration the great difference existing in pyroxyline and its capability of resisting washing, and I have more than once obtained by Mr. Lea's plan an emulsion giving any desired degree of density.

The objections raised against my own plan were that the pellicle became leathery and impermeable to the action of the washing water, that the soluble salts were imperfectly removed, and that the dried pellicle became very difficult of re-solution. These objections have been, however, I think, exaggerated; certainly the pellicle, if very thick, becomes "leathery," and requires a long washing to thoroughly remove the soluble matter, but that it becomes impermeable is with equal certainty incorrect. So long as the mass contains soluble matter diffused evenly throughout its bulk the water is bound sooner or later to remove it by a species of dialysis. It is a different affair altogether when a film of collodion containing no soluble matter whatever is allowed to dry; the pores of the film then contract and close, and the subsequent moistening with water fails to restore them to their original open state. Even then absolute impermeability does not result, as is abundantly shown by the possibility of developing an image by means of an aqueous developer.

Turning to the question of completely drying the pellicle previous to the application of water, the difficulty of removing the soluble salts would appear to be greatly increased; my readers will perhaps be surprised to hear that the direct reverse occurs (I am speaking now of a moderately thick layer—say the thickness of a piece of stout cardboard *when dry*). It must be borne in mind that the dried pellicle contains a large proportion of soluble matter in its pores, and that the retarding action brought about by the repulsion of the washing water by the ether and alcohol is entirely removed. The water, in fact, has nothing to do but enter the pores of the film by dissolving the crystallisable matter contained therein.

How little difficulty is likely to be met with in this direction is, I think, plainly shown by a simple experiment. Let two plates be coated, one with a washed and the other with an unwashed emulsion, and both thoroughly dried by the application of considerable heat. If these two films be now exposed for some time—say an hour—to a moderately damp atmosphere a great difference will be discovered in their appearance. Whereas the washed emulsion will have undergone no change, the other will be found to be covered with a dewy moisture, as of condensed steam, and varying in intensity in proportion to the length of time allowed to lapse after drying. This arises from the deliquescent nature of the decomposition salts (the nitrates of cadmium, ammonium, zinc, &c.) contained in the film, and surely if they *attract* moisture from the atmosphere there is not likely to be much difficulty on the part of the water in getting at them when they are immersed therein.

Such were the views I had long since formed, but until last week I never put the experiment into actual practice. Now, however, I am in a position to report upon the success of the trial, not only as it affects the possibility of removing the soluble matter under those conditions, but also in its bearing upon the density of the resulting emulsion. I may briefly recapitulate my experiment. Twelve ounces of collodion (bromised with cadmium and ammonium bromides in equivalent proportions) were sensitised so as to leave a very small excess of soluble bromide—in fact it was nearly neutral. The emulsion was allowed forty hours to "ripen" and was then divided into three equal portions, one of which was precipitated, a second washed in the usual moist or leathery state, and the third completely dried by heat before applying the water. These I will designate Nos. 1, 2, and 3 in the order I have mentioned them.

The free bromide, and with it we may presume the rest of the soluble salts were, of course, removed from No. 1 in the shortest time, but the smell of methyl remained with this as with No. 2 for a considerable time; indeed, it scarcely disappears entirely until drying is effected. Nos. 2 and 3 were washed simultaneously in equal quantities of water, and were allowed to soak for the same length of time in each change. Three changes completely removed the bromide from No. 3, while five were required to effect the same end with No. 2. The washing was continued until No. 2, by its general appearance and smell, appeared to be freed from soluble matter and solvents as far as it was possible to do it. So much for the possibility of washing the pellicle after total desiccation.

The three products were then dried by heat and redissolved in similar quantities of solvents. No. 1 dissolved almost instantly; Nos. 2 and 3 required several hours, with shaking at intervals. No. 1 was less rich in colour and gave a thinner film than the other two, between which, as regards appearance, there was little to choose. The dried film obtained with No. 3, however, appeared to be harder and more glass-like than No. 2, and, possibly (though it may be fancy), a little finer "in grain."

The photographic properties may be very briefly stated:—No. 1 gave a clean but feeble image with alkali and required silver intensification; No. 2 gave density with alkali alone without trouble, but no pushing would produce the almost complete opacity obtained with a sample plate tried before washing the emulsion. No. 3 *developed* in exactly the same manner as No. 2, but when the solution was strengthened the density "jumped up" with great rapidity, and the image obtained was, in every respect, as dense as the unwashed sample, though different in colour.

So far the results appear to be strongly in favour of washing in preference to precipitation, but more especially in favour of complete desiccation of the emulsion before washing. The addition of a little glycerine or soap, as recommended by me on the first introduction of the washed emulsion, may possibly aid in the rapid washing of the pellicle, but, as shown above, is not necessary.

In conclusion: I may be allowed to express an opinion that most of the objections raised against washing the pellicle are to be traced to a habit of pouring it out in too thick a layer. I have seen it cut into "blocks" half an inch each way whilst moist. I formerly recommended an area of eight square inches for each ounce of emulsion to be poured out, but this may be considerably increased. A good plan I once adopted is to take a number of clean plates—size and number depending upon the quantity of emulsion to be washed—and to coat and recoat them in turn three, four, or five times, until the whole quantity of emulsion is used up. The washing is then conducted in the ordinary way, and a considerable saving of time, both in setting and washing, secured. The thick films split off the glass when dried; hence the plan is perhaps not so well adapted to the system of drying before washing. W. B. Bolton.

INTENSIFICATION.

In giving expression to a few thoughts suggested by photographs exhibited for sale the intensity of the negatives from which they were printed seemed to be a most important consideration, both from an artistic and a commercial point of view.

Opinions have differed, and in all probability will always continue to differ, as to the proper strength of a negative, each operator having his own ideas on the matter; for much, in reality, depends upon the printing afterwards. A thoroughly good negative will print well under almost any conditions; all the processes of getting the print will seem to work smoothly and pleasantly when such negatives have to be dealt with. The smooth and pleasant working seems to depend, in a great measure, upon the intensity of the image. To take a negative wet from the hands of the operator and give a decided opinion upon its sufficient or insufficient strength, unless one or the other quality is very decidedly pronounced, is impossible, unless to some one accustomed to the particular method employed for its production. "It will be right when it becomes dry" is the almost unanswerable assertion, and one that is constantly made. Whether it *is* right when it is dry is another matter.

Intensification is of two kinds—one requisite for preserving half-tones and modelling, and the other for producing perfect opacity with no regard whatever to gradations. The first kind is constantly in use in almost all studios, applying, as it does, to most classes of work—portraiture, landscapes, and reproductions generally; in fact, to all except designs and drawings or subjects that consist of series of lines or dots in pure colour, that give the idea of half-tone by their nearness or separation, and represented on the negative by perfect transparency and opacity.

Intensifying being the proper strengthening of the image—such that will enable the more dense portions to resist the passage of light sufficiently long for the image to be thoroughly impressed on the sensitive paper through the less dense portions, and for permanent and brilliant results—a tolerably strong image seems absolutely necessary, whatever may be the means adopted to obtain it. The thin and delicate images now so popular require the most careful printing in the shade to produce good results, and cannot, in the nature of things, produce such permanent results as those of a stronger character. Occasionally we see negatives full of detail both in lights and shadows and with strong printing powers—in fact, perfect negatives; but where we see one like this we see hundreds of an inferior kind. Perfect negatives, in a chemical and optical sense, ought to be the rule not the exception in the present advanced state of photography; and this consideration brings me to the point that has instigated these remarks—are *perfect* negatives requisite, or proofs from them more pleasing and saleable, than those from inferior *clichés?*

I am inclined to think they are not. That the most perfect negative as a negative will not produce an artistic picture more pleasing or more saleable than one of inferior quality, is a disappointing admission, but fully borne out by a visit to the shops where photographs are sold. So long as the composition and lighting is good the manipulative excellence is quite a secondary consideration. Artistic qualities are the *only* qualities appreciated by the public in their judgment of a photograph. It is remarkable how the most experienced photographers are influenced and biassed in favour of an artistic and pleasing subject; the beauty of the design really prevents a fair criticism of the quality of the photograph irrespective of it, and will pass off in the first ranks as second-rate manipulative work. In portraiture—to which these remarks principally apply—a clever composition of a pleasing subject, well lighted, will, providing the the flesh is retouched with ability, pass off a vilely-manipulated negative in the first class with others of undoubted excellence—at least in the estimation of the purchasing public. Photographers may, however, take heart, for a thoroughly good negative produces a richness and quality in the prints unattainable by any other method; and this richness and quality depends very much on its intensity, other things being as they ought.

That in the most perfect negatives the deepest shadows are represented by points of clear glass and the highest lights by points of absolute opacity is an axiom I cannot altogether agree with. It sounds theoretically correct, but in practice and on ordinary subjects is not right; for to obtain absolute opacity in any portion of a picture (I am alluding to portraiture) over-intensification will result, and to get clear glass in the shadows simultaneously under-exposure is necessary; either one or the other result is sure to take place. The best negatives by the best photographers I have ever seen have had not a vestige of *clear* glass about them; and, whether in portraiture or landscape work, clear glass should, it seems to me, be absent. If it be present it is a sign either of under-exposure or under-development unless in very exceptional cases. Perfect opacity means considerable intensification, and considerable intensification means harshness. This retouching attempts to remedy, and does so to some extent; but, as the retouching is mainly confined to the lighter portions of the pictures, the principal part is left cruder and harsher than it ought to be, and this effect passes under the name of "brilliancy"—another name for under-exposed photographic pictures of all sorts. Yes! brilliant at the sacrifice of many other good qualites.

By want of intensity we rush at once to the other extreme—too much half-tone or too little separation of delicate shades and gradations. The negative may look nice—in fact, a negative slightly deficient in this respect is the nicest looking of all negatives—but, in printing, to obtain a bright result several of these half-tones merge into one and result in flatness, and do not print nearly so well as expected. Another drawback to insufficiently-intensified negatives is the readiness with which all defects on the albumenised paper show up. Paper considered excellent by a printer of strong negatives would be quite unsatisfactory when printing thin ones. There is no pure white in pictures from such negatives unles sintroduced by retouching, and, generally speaking, the colour is not good.

The intensification of the other class of negatives alluded to is, of course, different, as different results are aimed at, and is carried on until the deposit is perfectly opaque. At the same time a negative through the dense parts of which the flame of a candle can be seen will print equally well, and sometimes even better, than one more intensified. In all cases I believe the less intensification the better, so long as sufficient is done to produce a bright result in the print.

In landscape work, in addition to composition and lighting, perfect manipulation is a *sine quâ non*. The retoucher can lend but partial aid. Shadows massed artistically *must* be full of detail. Lights without detail are designated "chalky;" and unless a landscape negative have all the good qualities a negative should possess it is at once condemned both by photographer and public as inferior work. Intensification, therefore—whether in portraiture, reproductions, or landscape work—plays a significant, if not the most important, part. Edward Dunmore.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

This being the tourist season, I have read with a more than usual degree of interest an editorial article in this Journal given under the heading *General Arrangements for Field Work*. Having in my capacity of a peripatetic photographer enacted the *rôle* of the nomad many a time, I have acquired so much experience as to know at least what are my own requirements when "out and about," camera in hand. The difficulty of providing mats to place between the faces of the plates, so as to keep them separate, is not so great as may be imagined. Each photographer may construct them for himself by procuring sheets of very thin cardboard the exact size of his plates, and then, by means of a straight-edge and a knife, cutting out the middle so as to leave a border of any desired width. I adopt a still simpler method than this. Having procured a number of slips of thin cardboard I fasten them together at the corners by means of glue. The most expeditious manner of doing this is to lay down upon a table a glass plate the correct size, then place upon it one of the slips of cardboard, making its outer edge correspond with that of the plate. This is retained *in situ* by means of a small pill-box full of shot, several of which should have been prepared, or provided, before commencing operations. A little glue having been dabbed upon the end, at the corner of the glass, a second slip is placed upon it, and, like the former, retained in its place by means of the shot-box. After becoming quite dry the corners are trimmed, if necessary, by a knife, the services of a file being had recourse to in order to smooth excrescences and thin the inner edge of the mat, which it is better to have bevelled a little to the inside. One dozen of these mats answer for two dozen plates, and no one who has used them once for packing plates would willingly employ any other means for effecting such end. *Apropos* of numbering the back of the plate so as to correspond with the entry in the note-book, without which no photographer must betake himself to the field: if the plate be backed it can be written on with a common blacklead pencil, but if there be no backing a small bit of very hard soap forms an excellent writing medium. Some years ago I made a special preparation with which to write upon the backs of plates. It consisted of a quantity of lampblack incorporated with soap by melting the latter. This answered admirably, but I found latterly that the colouring matter was not at all requisite. For this purpose the soap should be very old and hard.

I observe that in the various formulæ given for alkaline development bromide of *potassium* is usually recommended as the restraining agent. One day last month, when paying a visit to a clerical friend, I found him in quite a "state" on account of his having just made the discovery that his stock of bromide of potassium was exhausted; and how then was he to develope the plates, upon which exercise we had both set our minds as the preliminary to an evening's enjoyment of a different kind, in which the "feast of reason and the flow of soul" would be permitted full play without the presence of any restraining agent, however potent might be the developing agents that were to be employed in stimulating our social feelings? "But," I observed, glancing towards his shelves, "you have other bromides there; why not make use of those of ammonium or cadmium?" He appeared surprised at being informed that the base of the bromide was of little consequence when making use of it in alkaline development; and we obtained several fine negatives by the aid of bromide of cadmium. A white precipitate of carbonate or oxide of cadmium is formed according as the carbonate or liquor ammonia may be used, but it has no effect upon the resulting development. As there may be others among my readers who, like my genial clerical friend (at whose suggestion I write this note), pay a too close attention to the letter rather than to the spirit of a formula, I would have them to know that bromide of potassium is preferred to other bromides mainly on account of its cheapness. Other bromides will answer the purpose equally well.

There is an expression in a report of a recent meeting of the Edinburgh Photographic Society that is not quite clear to my apprehension. Enumerating a list of members that were "unanimously elected," I find among them "Mr. Peter Ferguson *by* Mr. Tod; Mr. James Abbot *by* Mr. Matheson; Mr. Ross *by* Mr. Young," and so on. Does this mean that the latter-named gentleman in the names thus coupled together is the sire of the newly-elected member, as when in race-horse phraseology we speak of Flying Charlie *by* Blue Peter, or *out of* Forest Nymph? or, to put it in a more national manner, is the "by" the synonym for Mac (son of) Donald or anybody else? If I am correct in this surmise, I may observe that although it may not appear to be of much interest to the present-day reader to know from whom a member of the Edinburgh Photographic Society is descended, yet in future times, when fame and honours sit worthily upon the brow of any such member, it will really prove interesting to know, from referring to the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY, that such a member had a father who was not ashamed to own his offspring. The idea is an excellent one, and should be generally adopted. Seeing, however, that "he is a wise son who knows his own father," all existing doubt relative to this may be got rid of by giving the name of the *mater* for that of the sire. The statement that the members were *unanimously* elected precludes the idea that one gentlemen was *elected* "by" the other, and equally impossible is it to entertain the thought of one having been *proposed* by the other, as the act recorded refers to election. Anyhow, this Society must be in a very healthy condition, for not only can they afford to give a presentation print, which is more than the chief London society can do, but can also organise and enjoy a trip to the country, and, in addition, "bag" a large number of new members at their indoor meetings. Happy fellows!

(To be continued.)

A QUESTION OF TIME.

"LET well alone" is, no doubt, under certain circumstances, an admirable motto, but its application is sometimes overdone, especially when it is made to cover a disinclination to get out of the beaten path, and an apology for continuing in "the good old way" long after a shorter and better road has been opened up. An examination of the work of our best photographers during the last half-dozen years —and by "best photographers" I mean those who have by diligent study mastered the principles of art and attained something like perfection in the technicalities of manipulation—will show that, as far as finished results are concerned, there is little room left for improvement, and that little, we shall be told, is, first, a shortening of the time of exposure so as to enable them to catch a fleeting expression; and, secondly, a getting rid of the bath and all the vexatious troubles connected with it.

Shortly after the introducton of the emulsion process, now a good many years ago—or, rather, after its revival, as, like most other good things in photography, it lay dormant for a considerable time—the most advanced thinkers on photographic subjects predicted the speedy dissolution of the bath with all its attendant troubles. But, although vast improvements have been made in the process since then, including a rapidity greater than wet collodion had, with few exceptions, ever shown, and a certainty almost mathematical in its exactness, I doubt whether there are half-a-dozen true professional photographers who have availed themselves of its advantages, and I suppose there are hardly a dozen who have really given the process a thorough trial.

Professional photographers have, of course, some excuse for this unsatisfactory state of matters in the frequency with which their attention has been called (and in not a few cases their pockets lightened) to processes that have promised much but yielded little. Although, however, there has doubtless been much "blarney" written on emulsions, the reliable information contributed by thoroughly trustworthy writers ought to have been sufficient long ago to convince the greatest sceptic that in neglecting the process he was overlooking his own interests.

While urging this fact on the consideration of those with whom I frequently come in contact, I have occasionally been told that it really had been tried, but that from want of time or other cause the trials had been made with plates or emulsion supplied by the manufacturer, and that while some plates or one sample of emulsion worked satisfactorily, the next batch from the same source did not. There may be truth in this, but *was* the fault in the material or in the method of using it? There is no royal road to the emulsion more than any other process, and I hesitate not to say that, with all the available information on the subject, one-tenth of the study given to the management of emulsion that has been bestowed on the ordinary wet collodion method would banish all the doubts and difficulties that have hitherto prevented its general adoption.

Although I am aware that already much published formulæ, and many commercial preparations, by any of which the most rapid and highest class work may be done, are in existence, I fear that the subject will for some time require to be pressed on the attention of photographers before they will be induced to "take kindly" to it, and so think I may help on the good work by giving some details of what I have seen and done in the matter.

Foremost amongst those who have done much good, practical work in emulsions stands Mr. H. J. Newton, the President of the Photographic Section of the American Institute. Having recently had an opportunity of spending some time with that gentleman, this process was naturally the subject of conversation; and as he is an enthusiastic experimentalist, and ever ready to give his co-workers the benefit of his experience, I learned a good deal of what he is doing, and what he yet expects to accomplish.

In the first place, Mr. Newton directed my attention to a number of about 12 × 10 landscapes from his emulsion negatives; and, most certainly, no one who sees them, and compares them with even the best results from wet collodion, will ever again say that a dry plate cannot give a perfect negative. The prints were toned a rich, warm, purple brown, and, while perfect in breadth and fine contrast, were full of most charming detail; in fact, they were a set of the most perfectly beautiful photographs I have ever seen. In portraiture, also, he showed some hardly less fine specimens. Most of them had been taken in his own studio, which is lighted by a window in the roof of about four feet square, and with an exposure of only six seconds. Anxious to compare the emulsion with wet collodion as worked in an ordinary studio, it was tried by one of his friends, and the result is before me now in a portrait of himself, fully exposed and technically perfect, with an exposure of only two seconds—less than one-third of what would have been required to produce the same result on a wet collodion plate.

Mr. Newton's formula for emulsion has been repeatedly published, and differs little from that originally used in this country, the principal requirement being that of perfect neutrality, or with only the faintest trace of free bromide. Since then I have repeated the experiments, using an ordinary emulsion made, in the first instance, with six grains of cadmium bromide, three grains of ammonium bromide, and fifteen grains of silver nitrate. I ascertained at the end of six hours the exact quantity of ammonium bromide required to neutralise the excess of silver, adding just a trace more, and using it after standing forty-eight hours. I may add that I know by experience that this emulsion will keep in perfect working order for at least ten weeks, and probably for as many months.

The great sensitiveness and other good qualities of Mr. Newton's plates are due to a large extent, in his opinion, to the preservative he uses, which is as follows:—

Japan tea	¾ ounce.
Alcohol	6 ounces.

Boil for a short time.

The preservative is made by adding half-an-ounce of the alcoholic solution of tea to sixteen ounces of water, and used in the ordinary way after the plates have been well washed. I am not aware whether "Japan tea" is known in England; but as Mr. Newton assured me he had not succeeded so well with the product of either China or India, I got some in New York, which has been used in my experiments. Of course this is only to be used when the emulsion is to be worked dry; and, as Mr. Newton is evidently aware of the prejudice still felt by many against dry plates, he has energetically endeavoured to perfect a method of working the emulsion wet, and with such success that, without difficulty, practically instantaneous work may readily be done with it. In this case the plate is coated with emulsion and washed till greasiness disappears; then coated or flooded with an accelerator, and exposed while wet. In either case the development is carried on with soda carbonate instead of ammonia, as generally used in England; and Mr. Newton expressed surprise that any one who had tried both could ever give a preference to the volatile salt.

In reply to my statement that I had known several operators who had tried the soda formula as published by him, Mr. Newton said that he could quite understand that, as the developer must be modified to suit various conditions. He never meant the public to understand that as the formula he generally used, but merely intended it as an outline, to be varied as occasion required and experience dictated.

The accelerator referred to is made as follows:—

Water	12 ounces.
Carbonate of soda (washing soda)	180 grains.
Bromide of ammonium	2 ,,

This may be made in any quantity, and used in a dish or bath, as it will keep indefinitely, and may be used as long as it lasts.

Knowing what I do respecting emulsions, and after repeating over and over again Mr. Newton's experiments, I am more than ever convinced that already we have, both in gelatine and collodion emulsions, the power of making dry films as sensitive as, and far more certain than, wet collodion, and that they will be found better suited for studio work than it. It is, therefore, but "a question of time" when the bath shall for ever be laid aside; but till that time comes photographers will do well to turn their attention to working emulsions wet, and if they adopt Mr. Newton's plan they can hardly miss securing success. JOHN NICOL, Ph.D.

ON THE INTENSIFICATION OF NEGATIVES.

PHOTOGRAPHERS who only require to finish negatives for one purpose—as, for example, for silver printing—pay little attention to intensification. But it is quite different when the negative is also used for the purposes of enlarging and for carbon printing and lichtdruck, or for photolithography and photozincography. One soon comes to see that one negative cannot be used for all these purposes; that the requirements of a good negative for enlarging on the one hand, and for photolithography on the other, are quite opposed to each other. In the former case is required a fully-exposed, well-developed, and unintensified negative; while in the latter, on the contrary, a negative which has had but a short exposure and has then been intensified until the blacks are perfectly opaque is the most suitable. For lichtdruck and carbon printing those negatives are best suited which are almost too delicate and too slightly intensified for silver printing; but they must always be perfectly exposed and rich in half-tones.

Then, again, the age and composition of the various preparations—such as the iodo-collodion, the silver bath, and the developer—all play an important part in the attainment of the desired result; so that while a thin, delicate negative requires *freshly*-prepared chemicals and a *slightly*-acidulated developer, on the other hand negatives for photolithographic purposes require an old iodo-collodion, which has become red, and an acid developer, and, besides, it requires a special intensification after all. Indeed, as long as one keeps in view the fact that the lights of the negative should always remain clear, in this last and most extreme case it is scarcely possible to over-intensify.

Thus, when one has decided on this method of intensification, which is not merely a continuation of the development, no great stress is laid upon the composition of the original developer if only the lights of the negative remain perfectly clear under its influence. In such a case it is best to develope either with pyrogallic acid alone, leaving out the iron, or else to use only an old, already yellow, and strongly-acidified solution of the latter. On the other hand, again, if a negative pretty rich in half-tones be required to be either more or less thin and delicate, everything depends on the composition of the developer. If one require only a slight intensification, as if for silver printing, it must be done with great caution, and must partake more of the character of a continuation of the development.

According to Heighway this latter source of intensification is based upon alternate applications, *before* fixing, either of silver and iron solutions (after each of which the plate is well washed) or of pyrogallic acid and silver, the object being not to injure the details but rather to increase them; while true intensification of the already present blacks takes place *after* fixing, when, the iodide of silver being already removed, it cannot bring out any further details.

For very delicate negatives the following developer with formic acid is worthy of commendation:—

Sulphate of iron	12·5	grammes.
Distilled water	540	c.c.
Sulphuric acid	2	drops.
Formic acid	26	grammes.

Formic acid is best kept in narrow, graduated phials, and a sufficient quantity should be measured out and added to the iron solution very shortly before use. The development will proceed very rapidly.

In the case before us also the developer with succinic acid which I used at first is also very good:—

Concentrated iron solution	4 parts by bulk.
Concentrated solution of succinic acid	4 ,, ,,
Distilled water	16 ,, ,,
Alcohol	1 part ,,

When acetic acid, formic acid, or succinic acid in the iron solution is replaced by citric acid a far more powerful negative will be got. A solution of citrate of silver in as little as possible dilute nitric acid, afterwards diluted further by the addition of distilled water, is a very energetic intensifying medium. The above solution is poured upon the washed plate, and after it the ordinary iron developer.

The silver solution may be more easily prepared by dissolving—

Nitrate of silver	4 grammes.
Citric acid	6 ,,
In distilled water	100 c.c.

According to J. C. Browne, however, the plates intensified with citrate of silver possess the unpleasant property of always becoming darker, so that after having been kept for a few years they are useless to print from. When examined under the microscope the change that has taken place in the silver deposit is distinctly recognisable.

Though not distinctly coming under the head of negative intensification, a method of development may be mentioned here which has done me good service in cases where there is a question of taking small portraits rapidly—above all, those of children *carte* size. I used an iodo-collodion intended for direct positives upon glass (being that of Le Grice, namely, bromide of potassium, iodide of zinc, iodide of iron, and a trace of etherial oil), and after a very short exposure I developed by dipping into a concentrated solution of sulphate of iron *without either acetic acid or alcohol!* The image appears instantaneously, and is so powerful that no intensification is required. The dipping-in must be very dexterously done. The bath may be used repeatedly.

But to return to the proper theme of this article. I shall, in conclusion, describe the peculiar action of the several intensifiers.

Amongst these the compounds of mercury play an important part. The use of chloride of mercury itself has been almost wholly given up, because it is too unequal in its action. A not too concentrated solution, which is only poured on after the negative has been fixed and very carefully washed, acts slowly enough to allow of the intensification being watched. When the plates are large, however, there will almost always be some places that become white, especially when the coating with collodion succeeds and the picture film is therefore thinner. According to many formulæ the plate which has been treated in this way and has become almost white is well washed, and then coated with dilute (1:8) ammonia.

A solution of the red iodide of mercury in iodide of potassium is certainly better than the sublimate solution, as the former does not bleach the negative and acts much more equally. It is prepared very simply by dropping a sublimate solution into a strong solution of iodide of potassium, stirring all the while, until the red precipitate, which at first forms and then redissolves in the excess of iodide of potassium, no longer dissolves. One then dilutes with five or six parts of water and filters. The chloride of potassium which is thus formed as a by-product is not injurious. The supplementary treatment with ammonia is done away with.

As a general rule a negative intensified with a salt of mercury possesses the unpleasant property of darkening when repeatedly printed from. I have also frequently observed that the silvered albumenised paper printed upon becomes greenish in hue through contact with the mercuric film, and this is more particularly the case when the printing occupies a long time owing to the badness of the light. It is, therefore, advisable to confine the use of such mercuric salts to negatives which are only to be printed from once or twice, and even then only to be used with chromated paper, as for photolithography or zincography.

The old style of intensifying with sulphurous alkalies is not commendable, on account of the very unhealthy, and to photographic operators very injurious, development of sulphuretted hydrogen.

Eder and Tôth's lead intensifier—of which a great deal has been said in the photographic journals—requires, in order to be successful, the observance of many precautionary measures, and will on that account be less adopted in practice than it deserves, and than the intensification with iodine or one of the many other methods of intensifying. It is as follows :—The negative should only be developed with iron, fixed with soda, and very well washed, the last washing being with *distilled* water. The intensifying bath, in which the plates, while still wet, are laid for a few minutes, consists of—

Ferricyanide of potassium	6 grammes.
Plumbic nitrate	4 ,,
Distilled water	100 c.c.

When taken out the negative is washed thoroughly with distilled water until a drop of the washing water ceases to colour a solution of ferrous sulphate blue. We shall pass over the various precautions required by this method of intensification, as they have been so fully described in the *Photographisches Correspondenz.*

The very commendable intensifying process with iodine may be done in two ways, which should be chosen depending upon whether the negative is already varnished or not. In the first case one takes a solution of one part of iodine in 150 parts of alcohol of 90°, and removes the varnish by pouring hot alcohol of the same strength (without the addition of iodine) repeatedly over the negative before pouring on the iodised solution. This process may be repeated. The plate becomes very dark, therefore one should proceed with caution. When the alcoholic solution of iodine has been allowed to run off the negative is again varnished. According to the degree of intensification required a weaker or a stronger iodine solution may be used.

If the negative has not yet been varnished of course an alcoholic solution cannot be used; so six parts of iodide of potassium are first dissolved in one hundred parts of water, and then three parts of iodine are dissolved in that solution. An old solution works better than a new one. When the image has been sufficiently developed with the iron solution, and then with the iron solution to which a little silver solution is added, it should be *well* washed, fixed with a dilute solution of cyanide of potassium, and again washed *very carefully*. The plate is now coated with a sufficient quantity of the above solution of iodine in iodide of potassium, which is allowed to act until the negative has become yellow even when looked at from the glass side. The plate is then repeatedly washed, after which it is intensified, while daylight falls upon it, with the ordinary citric acid and pyrogallic acid solution to which a little silver is added. The plate is then well washed once more.

There are besides these still several very good ways of intensifying, as, for instance, that of Selle, by means of ferricyanide of potassium and nitrate of uranium ; and, further, those by means of the salts of the noble metals—gold, platinum, and palladium. We pass over these, however, as one can have too much even of a good thing, and with the methods already described the desired end can be attained.

—*Photographisches Wochenblatt.* JULIUS SCHNAUSS.

THE BIG SHOW.

SCENES AT CALAIS.—AT PARIS.—THE EXHIBITION.—THE ENGLISH PHOTOGRAPHS.

THE passage from Dover to Calais was short and anything but sweet, for the *swells* were abroad. The heaps on heaps of luggage piled up filled all the fore end of the vessel, whilst we, the poor passengers, hung like fringes round the edges of it. There did not seem to be many passengers for the quantity of boxes piled up on board, and the number of little "Noah's arks" that lay uneasily on the bevelled tops of each other looked mysterious in quantity and capacity. I got to speculating on the quantity of stuff they held, and what, in all the world, the possessors of them could be going to do with it; but making no headway in that speculation I gave it up.

During the two hours of "pitch and toss" we had to endure we did a little balancing performance when trying to walk from one end of the deck to the other. Not being constituted for "a life on the ocean wave," we endeavoured to keep clear, as much as possible, of those peculiar people who would have preferred to walk the journey if they had had the means of doing so. By those who, like us, have never travelled much, if possessed of the faculty of observing, it will be found that the kaleidoscopic changes of scene and form and character will produce an endless round of enjoyment. It is to be supposed that when travelling becomes familiar the novelty gets rubbed out of it, so that our feelings in this respect will have more interest for the untravelled, like ourselves, than for the traveller who looks upon such scenes and sights with a familiar eye, and consequently with a touch of contempt at this enjoyment of ours produced by inexperience.

We were greatly amused by one or two scenes that took place when landing on the shores of France. The gangway by which we left the boat was, to say the least of it, "a caution." It was of considerable length, and it stood as nearly as possible perpendicular from the side of the paddle-box to the quay. An old man in the midst of the crowd said—"It seems like a tempting of Providence to risk climbing up that thing ! It is as dangerous as walking the plank ; and if this is the way the French do things it really doesn't say much for them! I know a country where things are done better than that."

A little boy stood by the side of the ticket collector chattering away to him in his native tongue, when Jack turned to me with a smile on his good-natured face (and I can tell you it was something to get up a smile in that same crowd)—"Look there, Mark," he said, "at that child; do you not hear how he speaks French ! Man, it's wonderful !"

At the upper end of the gangway a man with book and pencil in hand stood and inquired the nationality of each passenger as he or she left the boat. In front of us a bold youth was passing from the gangway to the pier, when he was accosted by the book-holder with—"Wat contrie are you from, sare?"—"Glaiskey," the youth replied loudly, walking on evidently proud of the place of his birth, and doubtless thinking that "Glaskey" was just another name for Scotland.

We got into the train, and they took us up from the quay to the station, where ten minutes were allowed to get some refreshment. The time being short and the demand great, there was a considerable hurry-scurry, in the midst of which an old man lost his wife, which produced a little sympathy and considerable fun. The poor old fellow, when going from the refreshment-room to his carriage, saw with dismay his wife being whisked out of the station on her way to Cologne instead of Paris, having got into that train by mistake when waiting for her husband. The old man was a Scotchman, and the railway official did not seem to understand one single word that he addressed to him, so he stood in bewilderment and shrugged his shoulders, his eyes opening wider and wider as he perceived the canny Scot's increasing excitement. "They tell me she's awa' ta Cologne!" he exclaimed, pointing to the disappearing speck in the distance ; "and, man, she has baith our tickets for Paris, and I canna get on. I ha'e the purse, so she has'na a bawbee o' siller ! What am I tae dae? and what can she dae?" Though he yelled aloud the Frenchman did not understand a word, but a looker-on came forward and explained the old man's position, when he was conducted to the department where English business was transacted, and where he would likely have to wait the return of his "better half."

One thing that attracted our attention on the French railway was the women, with trumpets and flags and glazed hats, dotted all over the line and standing alongside of their sentry-boxes, their duty seeming to be to sound out that the line was clear. It looked very primitive.

We arrived in Paris all right, and first thing next morning we made it our business to visit the Exhibition. We drove to the Trocadero gate, and on entering and looking round our first sensation was that no definite idea could be conveyed of such a place. To stand and look in wonder and astonishment was our first action, feeling quite bewildered at the extent and magnificence of the place. It was like entering into a settlement composed of many nations who, having resolved long years before to build a city and live and intermingle with each other, had set about it then, and now sat enjoying themselves amidst the work accomplished ; for who would believe that so much could have been done in so short a time, if it were not standing there in very substance, produced as if by a wave of the magician's wand ?

Around us stand palaces and cottages, villas, shops, and tents, whilst away over the bridge stands the biggest show, the centre af a thousand other centres of attraction. On the ear sounds the tramp of many feet, the impression of whirl and movement is everywhere around, and the mingling sounds of the languages of many countries float on the air, as, spellbound in our excitement, we feel that surely this is the biggest show the world has ever seen.

After taking a look round we subdued our feelings and arranged our thoughts, naturally turning to our first love—photography. Purchasing a plan we started to study the same ; but even with a plan it seemed the most confusing place in the world to us. With some study and many inquiries we managed to find our way to the English department.

Having seen some of the best exhibitions of photography at home, I, at first sight, was rather inclined to be dissatisfied with the display from England. Even after careful examination the thought has not left me; for, although I believe we could not have shown better work in the various schools than is there exhibited, we certainly could have had many more exhibitors from amongst the first-class men of whom our country can boast. And although the work might be equal in excellence, the variety of styles itself lends a charm to such an exhibition, quite independently of its being an educator to the younger members of the profession.

Mr. Vernon Heath shows some fine pictures quite up to his usual standard, in saying which I can pay him no higher compliment, for they are choice in subject, artistic in feeling, and exquisite in detail.

Messrs. Elliott and Fry's portraits attract general attention, and justly so, for more artistically-finished pictures I did not see in the Exhibition. They are evidently worked up in chalk in the most delicate manner, and being well hung—which is an advantage even to the best work—the effect produced is simply charming.

Mr. Payne Jennings' display of landscapes is very fine. "Liquid pictures" I would call them, they are so clear and bright, and full of sparkle that you do not usually find on other photographs, except, it may be, when they are being washed, but which dies out as soon as they are dry.

Mr. A. L. Henderson's reputation amongst us for enamels is so well known that every visitor to the Exhibition, from a photographic point of view, will wish to see his *burnt-in* pictures. See them—they are beautiful.

Mr. Vanderweyde's pictures, taken by means of the electric light, are so good that you really would not know they were taken by artificial light—if he didn't advertise it.

Mr. D. Hedges' (Lytham) studies of dogs and cattle are fine productions, and of great value to artists as studies. Considerable skill and management are shown here with what we photographers find so difficult to manage—in fact, as difficult to manage as a baby is a dog or a cow; and its more to get a sharp picture than an artistic pose we aim at when we have such subjects to photograph. But Mr. Hedges has managed to make pictures as well as sharp photographs.

Mr. W. England's landscapes are so well known that I need make no comment on them here. But the same gentleman shows some photographs of statuary on glass, backed up with black, and having coloured drapery at the side, which are finely-finished pictures. It is a style of photograph that would make beautiful panel or window decorations.

The composition pictures by Mr. H. P. Robinson and Mr. R. Slingsby are always interesting, no matter how often they are seen; for they are works as artistic as if they had been produced by the brush and palette, and from the hands of a master, rather than by the lens and camera and such mechanical contrivances as printing-frames. MARK OUTE.

Meetings of Societies.

EDINBURGH PHOTOGRAPHIC SOCIETY.

AN outdoor meeting of this Society was held on Tuesday, the 18th ult., the excursion being to the Bridge of Earn, and included the beautiful Moncrieff grounds and the old-fashioned village of Forgandenny. A good deal of rain had fallen during the previous night, and it continued till within half-an-hour of the time of starting; but a number of the more enthusiastic workers had faith in the experience of the poet who wrote

> "I've seen a dark and cloudy morning
> Turn out a braw, sunshiny day,"

and appeared at the Waverley Station by 6.30. During the crossing of the Forth from Granton to Burntisland the sky looked threatening enough; but the party had their confidence considerably strengthened by the assurance of one of the members whom they met on board, and whose experience as a lieutenant in the navy has been considerable, that it would certainly be fine before they reached their destination—an opinion which, with the exception of about two hours, proved to be correct.

A two and a-half hours' journey before breakfast had sharpened the appetites of the party, and, therefore, on arriving at the Bridge of Earn about nine o'clock full justice was done to the substantial breakfast provided by the hostess of the Moncrieff Arms, after which the party put themselves under the direction of Mr. C. Sinclair, as the member best acquainted with the beauties of the locality.

The village itself possesses little interest from a photographic point of view, the only thing worth notice being the remains of an old bridge, at one time the only means of crossing the Earn on the high road from Perth to the south, but long since superseded by the fine modern structure from which we suppose the village takes its name. It is, however, very picturesque, and well worth more time than, according to previous arrangements, the members could devote to it. Originally consisting of five arches, and built much in the style of the fine old bridge at Stirling, only two now remain; but they are so broken up with massive ivy, and stand at a spot where the water is generally as smooth as a mirror, reflecting on its surface both the arches and the beautifully-variegated banks, that very many pictures sufficiently perfect in composition to please the most fastidious taste may be obtained. In fact, from the nature and position of the bridge, and especially in combination with the ruins of a cottage that had at one time guarded its northern approach, the ever-changing position of the sun "from early morn till dewy eve" would afford a succession of pictures well worth the attention of a Wilson or a Bedford.

Perhaps no body of men know better than the members who attend the outdoor meetings of the Edinburgh Photographic Society how absurd it is during such excursions to attempt to visit several places at considerable distances apart, and none have more frequently resolved to limit themselves to one good spot in the future; yet, nevertheless, there have been few such meetings at which much more was undertaken than could be conveniently accomplished. The excursion in question being no exception to the rule, there was only time for the exposure of a few plates on the quaint old bridge before the break was ready to convey the members to Forgandenny. This is an antiquated village composed of a number of thatched houses, each with a pretty and well-kept flower-border in front, which (with the exception of a school-house and perhaps two small dwelling-houses) have remained unaltered for about one hundred and thirty years. Here there is *matériel* for a number of good pictures, and in a short time all the cameras were at work; but by the time two plates had been exposed in each the clouds had gathered and rain was falling heavily, the members gladly taking shelter under trees and in the school-house, and by the time the weather had again cleared up the order to return had to be given.

After a hurried luncheon a visit was made to a lake on the Moncrieff estate, and although some of the party were somewhat reluctant to go, its extreme beauty and suitableness for camera work, as it burst upon their view, elicitated exclamations of surprise and pleasure from all present. It is nearly half-a-mile in length, tortuous and varying in breadth, and in many places completely covered with beautiful vegetation, in which lovely water-lilies abound. The banks are wooded, in most cases, to the edge of the water, and as the foliage is now at its best the effect is simply charming. It being at once agreed that the lake was well worth a whole day, and the resolution taken that one should be given to it at an early date, the party retraced their steps to the high road, where the break had been left, and drove up to Moncrieff house; but neither it nor the beautiful and admirably-kept grounds afford much scope for photography, and so only two plates were exposed, the rest of the members visiting, meanwhile, the fine garden and hot-houses.

From thence the party returned to the old bridge, where a number of plates were exposed from different directions to those selected at an earlier period of the day, and shortly after five o'clock the notice that dinner was ready put an end to further work. After dinner an ordinary meeting was constituted, and Messrs. A. L. Dowie and Alex. Lindsay were elected members.

The return journey commenced at 7 30, and Edinburgh was reached at 9 45, the excursion having, on the whole, been both successful and delightful, while (rather an unusual circumstance where beginners are present) all the plates exposed were fairly successful, and the majority developed into excellent negatives.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual meeting of this Association was held on Thursday evening, the 27th ult., at the Free Library, William Brown-street,—Mr. H. A. Wharmby, President, in the chair.

The minutes of the previous meeting were read and confirmed.

Some exceedingly beautiful negatives, taken by the gelatino-bromide process were shown by Mr. H. Houlgrave. These were all the more interesting as they comprised both views and portraits, with their respective prints, so that their printing qualities could be examined. Mr. Houlgrave also exhibited a developing dish with wooden sides and glass bottom. Mr. Houlgrave described his method of working, and said that he had no difficulty in developing up to the edges of his gelatine plates, as he moistened them first in a solution of one ounce of alcohol to ten ounces of water, using a little of the same solution in his developer.

Mr. Ellerbeck exhibited a number of views he had taken during a recent tour in Switzerland.

The presentation prints for the past year were distributed, the print being a fine 24 × 18 view of the *Arch of Constantine*, from a negative by Mr. O. R. Green, enlarged and printed in carbon by the Autotype Company.

The July meeting is intended to be an outdoor one, if arrangements can be made for a suitable locality.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

A MEETING of the above Society took place on the 3rd May,—Dr. Vogel presiding. Two new members having been admitted, Baron des Granges placed on the table a number of landscape photographs, which he presented to the Society. Amongst them were two large panoramic views of Sparta and Athens, and a number of scenes in the South Tyrol. He (Baron des Granges) also made a communication with respect to Durand's new quick printing sensitised paper. When in Italy he had heard of and procured some of the paper in question, and though already six weeks' old he saw a landscape with printed-in clouds fully printed before his eyes in five minutes. The paper would keep perfectly good for three months. He also spoke very favourably of the euryscope No. C, and of Ross's new symmetrical lens, &c.

The meeting requested the Chairman to obtain specimen lenses, and to try them and report.

The Chairman then read the reply of the Imperial Patent Office to a protest which had been lodged against a patent being granted for shutter arrangements for a lens, by which it was claimed that with a single lens *separate* pictures could be produced, which, when combined, would produce a stereoscopic effect. This was to be done by a shutter with two holes.

The Patent Office replied to the protest that if the demand for a patent was made in favour of anything new, the office had nothing whatever to do with its usefulness.

The Chairman remarked that, apart from the question of usefulness, the idea of a shutter having two openings was not even new, as some seven or eight years ago the question was put—"How can a stereoscopic picture be taken with a single lens without moving the camera or lens?" and the following answer was given in the *Mittheilungen:*—"Take a large seven or eight inch lens, and *place in it a slide having two openings.*" Later on the following directions were given:—"Cover three quarters of the left side of a four-inch lens and expose; then cover in the same way the right side, and expose again on a new plate. When combined these pictures will give an excellent stereoscopic effect." He (the Chairman) exhibited a lime light fed with common air heated instead of with oxygen. Similar blasts were constructed some time ago in England by Fletcher, but they had lately been so much improved by Dr. Müncke that platinum melts in the flame, as shown experimentally by the Chairman at the meeting. The lime becomes heated to a white heat; still the chemical effect of the light is so small that, after an exposure to it of twenty-two minutes, at a distance of seven inches, a Vogel's photometer remained unaffected. In England a similar lamp is used with effect in the sciopticon, and in Germany by Warmbrun and Quilitz, of Berlin.

A number of Japanese pictures sent by Dr. Weissenbach, of Nürnberg, were laid upon the table.

Herr Marowsky begged those members who had not yet sent their portraits for insertion in the Society's album to do so at once.

The meeting was immediately afterwards adjourned.

THE PHOTOGRAPHIC SECTION OF THE AMERICAN INSTITUTE.

At the April meeting of this Society the President, Mr. H. J. Newton, occupied the chair.

The President: I understand Mr. Price is writing, in the *Photographic Times*, a continuous article on the practical process of working emulsion, commencing with the first rudiments, so that any one who is not a photographer can learn to work it by this article. The article will be continued through several numbers, as I understand, giving all the *minutiæ* in the working of emulsion. One of the impediments in the way of working emulsion has been the difficulty in making uniform samples. Samples made today and others made tomorrow with the same chemicals and formula may not produce like results. Such variations in photographic processes are not, however, exclusively confined to emulsions. This objectionable feature has been overcome by the peculiar method now adopted in the manufacture of my emulsion. The question has been raised here, and generally assented to, that emulsion or bromide of silver plates are not as sensitive to weak light as bath plates. That is almost the universal experience. Dr. Vogel alluded to this fact in an article which he wrote a year ago, and published in one of the European journals. As I have stated before, in my experiments the bromide, in this respect, differs not a whit from iodide. The first collodions were made with iodide alone, and it was years after the introduction of bromide with the iodide in this country before it was adopted in England. I have experimented with those two salts and their compounds in every conceivable way. I find that bromide and iodide used separately are almost identical in sensitiveness to weak light. Iodide alone is not sensitive to the weaker lights. It works strong in the high lights, similar to bromide; but when a small portion of bromide is added to the iodide the action is entirely different from what it is with either one separately, and the maximum benefit does not depend upon the large quantity of bromide, but the reverse. If you mix them in equal parts you get no benefit from the bromide. With bromide emulsion the same fact is true in reference to the iodide in conjunction. That fact has, perhaps, been elucidated fully here by a committee of this Section, appointed three years ago last fall, to investigate a process brought to this country by a Mr. Hammenstede, who came here from Japan, and who made a bromo-iodide emulsion. The question of the union of these two constituents is not the only important thing for the best results; it is the *way* in which the emulsion containing them is compounded. I claim that my emulsion, as now being made, is as sensitive to weak light as any bath plate that can possibly be made. In making these copies (shown here), being negatives on 8 × 10 plates and prints from the same illustrative of this fact, I took three different kinds of engravings—one that was nearly black, another with very delicate contrasts, and still another with very strong contrasts—to show that emulsion properly compounded would work on all of them, and give all the detail in the shadows or dark places in the engraving that it was possible to get by any process. When it will do that it approaches perfection.

Mr. Chisholm: How does that emulsion seem to keep?

The President: It keeps indefinitely. I exhibit two portrait negatives, the time of exposure being eight seconds. One I arranged so as to have very deep shadows, in which you will find no lack of detail. These negatives are just as they were developed and fixed. With the bath plate I could not have made negatives showing the same exposure in less than twenty-five seconds. With this emulsion I will do anything you can do with the bath plate, and in one-third the time.

Mr. Bierstadt: I accept the challenge, though I have never seen the negatives and prints exhibited here by the President excelled by any photographic process, if equalled.

The Secretary: These pictures are very beautiful; the details in the shadows and high lights are as finely rendered as I ever saw them. I cannot suggest any improvement; they are perfect.

Mr. Chisholm: Are you able to combine the iodide well with this bromide emulsion?

The President: Yes; I have used bromide three parts, and iodide twelve parts, and all the way from that extreme up to the fraction of a grain of iodide to twelve of bromide in almost every conceivable proportion.

Mr. Chisholm: The iodide has a clearing property; it makes a negative very brilliant and clear, and it does not fog.

The Secretary read the following from Mr. Palmer's paper, published in our issue of March 13:—"An experience of several years of this process [the emulsion process] has convinced me [the writer] that the very rapid emulsions which are at present in vogue were steps in the wrong direction, as great rapidity and reliability do not go hand in hand."

The President: In the article which the Secretary has read we find the expression of an idea which has always prevailed among photographers, not only in reference to emulsion processes, but to all photographic processes, viz., as one approximates towards the maximum degree of sensitiveness just in that ratio he would depart from certainty. That idea is not only applicable to emulsion, whether of gelatine or collodion processes, but to all photographic processes.

The Secretary: Probably that idea has originated and been sustained with and by the fact that a departure from the proper time of exposure with a rapid working process, if it be very small, shows more than a very much greater departure would with a slow process. I see no chemical reason why a quick process should not work as certainly as a slow process, provided you can work proportionately close to the *proper* time.

The President: Here is an illustration, being a print from a negative exposed twelve seconds; it is an over-exposure. If I had been working a process which would have required at least twenty-five seconds' exposure, four seconds more or less would not have materially affected the results. Now, with a process in which only eight seconds is necessary, to give it twelve increases the time thirty-three and one-third per cent. That is just where the difficulty, in my estimation, lies in reference to the uncertainty with quick processes; you cannot have the latitude that you have with slow processes.

The Secretary: Our English brethren seem to have given considerable attention to gelatine emulsion. The pictures by the gelatine process—though I have not seen a very large number—have usually shown a grain on the print, as though it was in the negative film.

Mr. Bierstadt: I have seen the plates just as free from grain as I have ever seen with collodion. I have some of Kennett's gelatine pellicle that I think is just about as rapid as Newton's emulsion.

The meeting was then adjourned.

Correspondence.

THE ALUM DEVELOPER.

To the Editors.

Gentlemen,—In your next issue kindly extricate me out of a difficulty which I at present experience with Henderson's new developer. The quantities are carefully measured, but on no account can I pour the developer over the plate without a flocculent precipitate settling all over the film and producing stains; without the alum there is no precipitate. I have tried two different baths. I think there must be two kinds of alum (independent of chrome alum), because I was successful with the developer when Mr. Henderson first published it, using a different sample of common alum; at that time I found it the best developer I had ever tried.—I am, yours, &c., R. D. P.

Edinburgh, June 26, 1878.

[We have never experienced the difficulty described. Perhaps Mr. Henderson can throw some light upon the cause. Our correspondent is correct in surmising that there are different sorts of alum; but we do not think it probable that this is the source of his trouble. Common alum, or potash alum, is a combination of sulphate of alumina with sulphate of potash. Ammonia alum, in which the potash is replaced by ammonia, is sometimes found in commerce; but, even supposing that to have been used, it is so similar in character and general behaviour to potash alum that it is little likely to act in the manner spoken of above.—Eds.]

FILTERING SILVER SOLUTIONS.

To the Editors.

Gentlemen,—Seeing that the subject of filtering silver solutions is on the *tapis*, I crave permission to describe one that I constructed two years ago, which is in use still, and promises to remain good for two more years.

Having obtained an ebonite funnel with a smooth inside, I procured a strip of steel about a sixteenth of an inch in thickness, and fixed it in a handle. Having rounded one edge I toothed it like a saw, and with this I cut a number of small grooves inside the mouth of the funnel from top to bottom, taking care not to cut through the ebonite. I next procured a piece of fine felt from the Wandle Felt Company in Endell-street, and having shaped it properly, I had the two sides sewed together, so as to fit the interior of the funnel, one edge slightly overlapping the other. This is the whole.

The felt allows the liquid to pass rapidly through, and the little channels or grooves which I cut with the saw in the funnel, act as so many gutters to convey the liquid to the nozzle, to which it passes with great freedom.

In connection with this filter I reiterate what "Ajax" in last week's number says of his, namely, "I like it very much, and should be sorry to be deprived of it."—I am, yours, &c., An Old Photo.

July 1, 1878.

Miscellanea.

Whitening Positives.—Bichloride of mercury and other things have been suggested and tried in the process of whitening a dark positive picture, but with no good and satisfactory result. We have found a very simple and pure method by which an ambrotype or ferrotype may be whitened in the shortest time and give excellent results. The first trial was with a much under-exposed picture, which was entirely too dark. After it had been fixed and dried we ran a stream of water over it again, in order to soften the film; we next prepared a mixture from one part of the usual developer (consisting of protosulphate of iron and acetic acid) with half a part of the silver bath, which was entirely neutral. This mixture we flowed over the picture, and after the lapse of four seconds the picture became nicely white; the half-tones appeared white, while the blacks of the darkest shades remained perfectly uninjured. The solution was now thrown off, and as a number of grey, dirty-looking specks appeared on the picture, the usual fixed solution was applied to it again, by which means the picture appeared faultless, the whites being intense and of a brilliant white. Since that time we have made the same trials with a different developer and an acid silver solution, and obtained the same excellent results. We have carried this redeveloping process farther, and in the course of one minute changed a good positive into an excellent negative, which printed very good. We have tried this method with pictures which were more than half under-exposed in the camera, and did not fail in a single instance.—*Practical Photographer.*

Increasing the Sensitiveness of Silvered Paper.—Mr. A. M. De Silva, in *Anthony's Photographic Bulletin*, says:—Some time ago, while making prints from a negative of a most difficult subject, in which from the excessive contrast of light and shade the lights had become too dense to my liking under development, I tinted the paper in the sun previous to printing the picture—a not uncommon practice in the case of "hard" negatives. After the prints were mounted I noticed that those made on the "dashed" paper *had more detail in the lights*—a distinctly different appearance to the toned-down flatness of prints receiving an after-exposure to the light; for, while they were mellow, they were by no means flat. Like very many valuable things, from want of application or want of time to study it was shelved until very recently, when I had occasion to resort to the same method. The grinding of the varnish of a portrait (a most abominable practice, for it takes the juiciness and texture out of the picture) had "hardened up" part of the face. I again "dashed" the paper *previous* to printing. This time, not only had I more detail in the high lights, but an impression printed *through* the yellow oval mask placed on the negative. I again tinted one-half the paper, and again the same result on the side tinted, while the other unexposed part did not print through the mask at all. Using the same mask I printed the portrait in the sun on ordinary paper until it was completely bronzed up without a particle of tint showing under the portions covered by the cut-out, thus conclusively proving that silvered paper which has received a preliminary exposure to the light is *very much more sensitive to a much smaller quantity of actinic rays.*

Hints in Printing.—Messrs. E. and H. T. Anthony and Co., in *Anthony's Photographic Bulletin*, say:—"Invariably with the occurrence of very cold weather commence complaints about the working of albumen paper. Printers, from one year to another, seem to forget all the advice they have received, and take no precautions against the evils they annually have to encounter. The present season has been no exception, and the complaints we have heard remind us that the oft-repeated injunctions must be uttered again. The whole trouble turns upon the point of temperature. To avoid, then, all the varied unsatisfactory results:—1. Use a warm silver solution for your paper—not under 70°. 2. As nitrate of silver does not dissolve as freely in very cold water as it does in tepid, and as it is generally difficult to warm all the washing water, use the acetic acid washing bath; this will convert the free nitrate of silver into an acetate or sub-acetate, and thus get rid of the excess of nitrate of silver, which is so detrimental to toning. 3. Warm your fuming box thoroughly. 4. Make your fixing bath with tepid water. The object of this is to avoid a trouble the cause of which few persons suspect. It is quite common to hear persons complain that the albumen becomes soft and disintegrated and leaves the paper without any gloss. The reason why such occurs is this:—In very cold weather, when the water directly from the pipe is used, the act of the solution of the hypo. frequently reduces the temperature below the freezing point. When the prints are immersed in this extremely cold menstruum the structure of the albumen is completely destroyed; its coagulation by the action of the silver bath completely neutralised, and it becomes like so much mush and is easily detached from the paper. Another effect of a very cold fixing bath is to cause the fine cracks which so frequently occur in prints otherwise unexceptionable. 5. Defective prints are also caused by exposure of the paper, while printing, to a very low temperature. This is indicated by the appearance of the prints. No length of exposure will give depth to the shades, and the prints when put into the toning bath become a sickly, pale red and refuse to tone. We trust that all our readers interested in the use of albumen paper will give proper heed to the above facts, and govern their printing accordingly."

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

I will exchange anything enumerated in advertisement for a good half-plate camera to take two *carte-de-visites* on a plate. See advertisement.—Address, A. Gosney, Sherburne.

Whole-plate mahogany portable camera, brass bound, screw focussing, central partition for stereos, equal to new; half-plate studio camera, swing back, bellows, and screw focussing; and a first-class double geared cabinet rolling press, steel plate, polished, and iron bed. Any of above will be exchanged for a No. 6 Ross' symmetrical, or a first-class tent for plates 12 × 10.—Address, W. Dakin, Holly Bank, Nether Edge, Sheffield.

ANSWERS TO CORRESPONDENTS.

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

Ch. Audra (Paris).—Your letter received. We are pleased that you appreciate our efforts, and shall reply more fully in a private communication.

Developer.—Are you employing a new sample of any of the ingredients? There appears to us no other solution of the difficulty from the data given. If using fresh ingredients test them individually.

Cymro.—Yes, let it be done inside by all means. This may be effected by erecting outside the window, and on a level with the window-sill, a small platform two and a-half feet wide by six feet in length.

Saml. Bamforth.—We have seen advertised a cheap press suitable for both purpose you mention, but do not remember just now the maker's name. We are not acquainted with any work specially devoted to the subject.

Erratum.—In Mr. T. Sebastian Davis's article, *A Wet-Plate Developer*, in our last number, page 303, first column, formula A, tenth line from foot, for "acetic acid, 15 minims," *read* "acetic acid (glacial), 1½ fluid drachms."

W. S. May.—If you are desirous of producing the large opalotype under conditions which do not admit of the possibility of fading, and are unable to do so by means of the carbon process, it only remains for you to have recourse to the "dusting-on" method, the powder to be employed being lampblack or vegetable black. Fading will not then take place.

Nemo.—Having subjected the figures provided by you to analysis we are enabled to say that the larger object glass will admit two and one-third times more light than the other.

E. O. P.—The failure arises from the use of a developer quite unsuited for the purpose intended. As we know that the maker in question accompanies each packet of plates with printed instructions respecting their development, we have only to refer you to such directions.

W.—The method you propose will answer well if applied in the form of black varnish as used for backing glass positives. Let three or four coats be applied, each being allowed to harden thoroughly for several hours *exposed to daylight*. A better plan would be to coat the bath with melted paraffine wax.

J. P., Jun.—The last traces of nitrate of silver in the film may be got rid of by placing the plate in a weak solution of chloride of sodium after it has been well washed with plain water. Upon removing it from the chloride solution wash first with plain water, and then give it a final rinsing with distilled water.

Auld Reekie.—We are quite familiar with both processes of photolithography named; and, while we admit that Professor Husnik's produces most successful results, we do not think that such results are in any degree superior to those obtained by the older process, while the latter is much the more simple of the two.

W. Washam.—It is just possible the cause may be *over-exposure*. These very rapid plates have a sad habit of losing the distant or well-lighted portions of the picture if the exposure be a little too long, though the foreground and shadows may appear underdone. A shorter exposure would permit the shadows to be pushed a little without endangering the lights.

Chas. B. Bradshaw.—The method of drying a gelatino-bromide negative suggested by Mr. Dudley Radcliffe will prove by far the most expeditious of any. It consists in washing the film thoroughly, allowing it to drain, and then immersing it in methylated alcohol, by which the water in the pores of the film becomes displaced. It will then dry in a few minutes.

Carboniensis.—Cut up a portion of the band of carbon tissue into small pieces, and sensitise each of them in a bichromate solution of different strength, the first being treated with a saturated solution, the next in a similar solution diluted with so many parts of water, and so on, reducing the strength more and more. By this tentative process you will ascertain the strength of bath that is best adapted for sensitising that particular band of tissue.

E. M. B. S.—Certainly the ferrous oxalate developer answers as well with gelatine as with collodion plates, as you would have seen had you paid attention to what has been recently written on the subject. There need be no variation from the formula given; experience alone will tell you what strength answers best. Commence with a saturated solution of ferrous in potassic oxalate, and dilute it gradually till you reach the desired point. See remarks in our last number.

H. H. F.—It is very unwise, unphilosophical, and irreligious for a master to swear at an apprentice; but, while this is the case, it will scarcely be held as warranting you in leaving your duties and running away. Our advice to you is to return voluntarily to work, and tell your master frankly that you are sorry for having so acted. The "accident," as you designate it, which elicited the outburst of temper alluded to may, probably, have been construed by him into an act of carelessness.

One in Doubt.—Try the following:—After sensitising the paper transfer it to a flat vessel containing distilled water, upon which allow it to float for a brief period—say for a quarter of a minute—after which allow the excess of the liquid to drip away and the paper to become dry. In this state the sheets thus prepared will retain their whiteness and purity for a long time. Previous to printing let the pads of the printing-frame be *slightly* sprinkled with ammonia. This paper not only keeps well, but yields vigorous prints.

An Inexperienced Photographer.—In our Almanac for the present year Mr. A. L. Henderson gives the formula of his developer, which we think it will answer your purpose to adopt as well as it has done that of Mr. Henderson and several others who have profited by his experience. In this developer there is present twice as much common alum as there is protosulphate of iron. For the details we refer you to the formula itself, which we need not here reproduce, as we presume you have the Almanac at hand to which to refer.

W. L. R.—1. On no account should paper be used, as in addition to rendering the operation a very protracted one it would deprive the emulsion of the whole of its bromide of silver. The best material is cotton wool or sponge well washed and freed from sand. Moisten with ether before pouring on the emulsion. To prevent evaporation lay a piece of clean paper, and over that a sheet of glass on the top of the funnel; sufficient air will find its way in to permit the operation to proceed.—2. There is no necessity to add fresh acid; the albumen becomes naturally more limpid with age. We prefer ammonia to the acid.—3. Ordinary *methylated spirit* is intended, but be careful you do not obtain "finish," which contains a certain quantity of gum.

Medicus.—The smallest and most portable of all photographic tents is the "Howard tent." It may easily be carried in a capacious pocket in one's coat. It is of a triangular form. In the course of a recent conversation with Mr. Howard he described in what manner he had been able to obtain a greatly-increased area inside without a corresponding increase in the external dimensions. Retaining the principle of making the tripod form the supporting frame-work of the tent, he has adopted a quadrangular form for the cover, by which he is enabled to manipulate plates of larger dimensions than before. Writing this "answer" at a great distance from home we are unable to give more definite particulars at present, or to refer to a drawing made by Mr. Howard when explaining to us the nature of the alterations he has found it expedient to make. On our return we shall probably revert to the subject and furnish details respecting this tent as it *now* exists in the possession of the inventor.

G. P. O.—The photograph of the cathedral is quite accurate so far as we can judge, but the perspective is so exceedingly harsh or violent as to cause an erroneous impression to be conveyed. The only way by which this can be rectified is to select a point of view at a much greater distance from the structure. It is quite a mistake to imagine, as many do, that the use of a lens having too short a focus possesses any influence upon the perspective of an architectural photograph; for no matter what kind of lens be employed, or whether its focus be long or short, so long as the point of sight, or that where the camera is placed, be near to the building the perspective will, of necessity, be violent and unpleasant. It is just the same as if you were taking a portrait of a *sitting* man with a camera placed about four or five feet from his projecting knees; his limbs would appear exceedingly stout in proportion to his body.

G. E. (Rochester, N. Y.)—1. Have you tried the plan, recommended a short time back, of coating the glass with a very porous collodion previous to the application of the gelatine? Apply the collodion and rinse in hot water to remove the ether and alcohol, and then coat with gelatine in the ordinary manner and allow the latter to soak into the collodion film, when the plate may be drained closely and *reared* up to dry. Such, at least, is the advantage claimed for this mode of procedure.—2. How did you treat the emulsion after precipitation? It would almost appear as if you had lost some part of the sensitive gelatine during the operation. The precipitated gelatino-bromide, after precipitation, should be soaked for a short time in water in order to remove a portion of the alcohol, which would otherwise prevent its complete solution.—3. We cannot speak as to the action of chrome alum upon the sensitiveness of the emulsion you name, but for plates of ordinary rapidity it does not appear to exercise any deleterious action when present in small quantity.—4. The question is difficult to answer in the way you put it. The plates are perfectly adapted to studio work and to the production of pictures of the highest class; but the question as to whether they will supersede the wet process is another thing altogether. We have heard them spoken of as "*too rapid* for landscape work," by which, we suppose, is meant *general* landscape work.

Colonel Davey asks us to inform him where he can obtain lenses constructed of glasses of different colours so as to enable him to conduct certain experiments. It would appear that he has become imbued with the idea that a blue glass lens will act more quickly than one formed of glass free from all colour, and also entertains other notions concerning properties believed to be peculiar to yellow and red glass. We beg to inform Colonel Davey, in the frankest possible manner, that he is altogether mistaken both with respect to the superior powers of transmitting actinic light possessed by a blue lens compared with a white one, and also as regards certain properties he imagines to be peculiar to orange glass. However, if he determine still to try the experiments hinted at, we advise him not to incur the needless expense of having lenses ground of coloured glass, but to have several pieces of plain glass, of various colours, fitted into a circular framework in such a manner as to permit of the insertion of one of them in front of the anterior lens of the portrait combination. In this way no light will be admitted through the lens except that which has had its properties altered by the transmission through the coloured glass placed in front. This will answer his purpose quite as well as if a series of lenses of coloured glass were provided, while it will save much trouble and no little expenditure of money. We have also to add that the experiments suggested by Colonel Davey were tried many years ago, and were attended with total failure. "A part is *not* greater than the whole." Let this axiom be thought of in connection with the imagined rapidity of blue glass lenses.

Manchester Photographic Society.—It had been proposed to hold an exhibition in connection with this Society, in Peel Park, next month. We are authorised, however, to state that the idea has been abandoned for the present.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For the Weeks ending July 3, 1878.

These Observations are Taken at 8.30 a.m.

June.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
20	30·07	105	77	52	57	60	SE	Hazy
21	30·15	117	79	51	57	64	S	Bright
22	30·21	118	83	56	60	69	W	Bright
24	30·09	97	87	62	61	72	W	Bright
25	30·20	122	87	67	63	71	W	Dull
26	30·20	119	91	64	68	77	W	Dull
27	30·156	123	91	66	69	77	E	Bright
28	29·954	119	86	64	66	74	E	Cloudy
29	29·858	119	85	60	65	72	E	Bright
July.								
1	29·920	86	69	55	57	61	NE	Cloudy
2	29·844	89	63	53	52	55	NE	Overcast
3	29·914	—	—	53	53	58	NW	Cloudy

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 949. Vol. XXV.—JULY 12, 1878.

IS EXTREME RAPIDITY DESIRABLE IN DRY PLATES?

In asking the above question we do not wish our readers to suppose that we intend to advocate a retrograde step in the practice of dry-plate photography. Such a course is far from our thoughts; but, as will be gathered from the succeeding remarks, our aim is rather to draw attention to a growing tendency which promises ere long to bring that branch of the art into disrepute—at least in the minds of a large proportion of the unthinking of its followers. The tendency to which we allude has been aptly termed, by Professor Piazzi Smyth, "rapido-mania," and a more suitable name could scarcely be found for the inconsiderate attempts which are made to promote extreme rapidity at the expense of other and equally valuable properties.

This is undoubtedly strong language, but in using it we speak advisedly, and, moreover, with a full appreciation of the advantages derivable from the quality in question for special purposes. Our object, however, is to raise a note of warning against the too eager pursuit of what may under certain circumstances prove to be a phantom. As we have said, we appreciate to the fullest extent the advantages—nay, the absolute necessity—of rapidity for such purposes as portraiture and for the proper rendering of the class of subjects which come under the heading of "instantaneous;" at the same time we fail to see the necessity, and question the desirability, of the same exalted degree of sensitiveness for the purposes of ordinary landscape work.

It may, and no doubt will, be urged against us that sensitiveness cannot possibly be a detrimental quality; that a plate sufficiently sensitive to enable us to secure objects in motion is equally adapted to the rendering of subjects of any other class. The wet process, which until recently has been the representative of extreme rapidity, will be cited as an instance in which we have, combined with the most exalted sensitiveness, the capability of rendering any and every class of subject it is possible to conceive. We are quite prepared to agree that sensitiveness is not and cannot be in itself an objectionable feature in any process, but circumstances may combine to render it so. Let anyone who doubts this explain the reason why wet-plate work as a rule is superior to dry. It is impossible to claim at the present day that a wet plate is capable of producing a better result than a dry plate under the most favourable conditions. The dry-plate work of some of our best men sufficiently proves that there is no inferiority in the process itself; hence we must look further for an explanation of the difference in the general quality of the two classes of work. There is little difficulty in tracing it to the varied conditions which attend the practice of the rival methods, and we shall endeavour to show that the element of sensitiveness plays a by no means unimportant part in the calculation.

It is usual to speak of the "latitude of exposure" permissible with dry plates as one of the strong points in their favour, removing, as it does, the necessity of judging to an extreme nicety the time of exposure. Certainly, if this latitude did not exist the practice of dry-plate photography would cease to be possible under ordinary conditions, and a reliable means of estimating not only the power of the light but also the actinic value of the subject would become a *sine quâ non*. In what does this latitude consist? And, further, we may ask—Is it peculiar to dry plates? To the latter query we reply distinctly, "No." No matter what the process may be there exist certain limits between which it is possible to curtail or prolong the exposure and still obtain a good but not a *perfect* result. The interval between those limits bears a direct proportion to the sensitiveness, and may amount to minutes with a slow plate while it is reckoned in seconds with a rapid one.

In this matter we agree with the writer who some years ago expressed the opinion that with a given light and subject a certain exposure is necessary to produce a perfect picture, and that any variation from that time, though it may produce a *good* result, does not attain perfection. Most dry-plate workers will have noticed at some time or other that in developing a number of plates one has, perhaps, singled itself out from the rest as being in some indescribable way superior. It is not, perhaps, easy to say in what its superiority consists, but it carries with it a certain "tone" (to quote the writer alluded to) which distinguishes it from its fellows. We should point to such a picture and say—"Here is the result of correct exposure."

At a recent meeting of the Photographic Section of the American Institute the Secretary exactly conveys our own impression when he says, as reported at page 320:—"I see no chemical reason why a quick process should not work as certainly as a slow process, provided you can work proportionately close to the *proper* time." This contains the whole gist of the matter in a nutshell. The remark was made with more special reference to the alleged want of reliability of the more rapid dry plates; but it bears equally, we may say more strongly, upon the quality of the result. It means simply this—that in working a process which necessitates exposures reckoned by minutes a departure of a minute or two more or less from the correct time may possibly not greatly influence the result; whereas, when the exposure is counted by seconds it is necessary to so nicely judge the timing as to be within the limit of a very few seconds.

This, with the wet process, is comparatively easy, as the first plate exposed enables the operator to form a tolerably accurate judgment as to whether the time is correct or not, and hence it is possible, either in the studio or in the field, to expose plate after plate with very little departure from the "proper" exposure. Not so, however, with rapid dry plates. Here everything depends upon judgment; and clever indeed must he be who, even with the aid of an actinometer, succeeds in timing to a second or two the whole of the plates constituting his day's work. With plates of a lower degree of sensitiveness no such necessity for this extreme exactitude exists, and the risk of failure is therefore considerably lessened. The fault, if any, is one of circumstances, and cannot be fairly laid to the account of the plates themselves; but, until some important improvement shall be made in the form and capabilities of our field actinometers, a moderately-rapid plate will continue, we think, to possess an advantage over those of the highest sensitiveness for general out-door work.

That the difficulties attending the working of very rapid plates is not merely imaginary we have had forcibly brought home to us recently. We had been for some time using experimentally two distinct classes of plates, and numerous comparative trials had proved that upon a well- or evenly-lighted open view the relative exposures necessary stood in the proportion of one to five. So long as we adhered to subjects in which no violent contrasts were presented these proportions remained good; and even if the exposure had been a little more or less than it should have been, careful development enabled us to produce at least a passable result. But the weak point of the rapid plates showed itself painfully in subjects comprising widely-different gradations of lighting, as a shaded foreground, with well-lighted distance, and under such circumstances, even with the most accurately-timed exposure, the greatest possible care was necessary in development to avoid spoiling the harmony of the picture. With such a subject as we have instanced it is obviously impossible, without the aid of some special contrivance, such as a sky shutter, to time each portion of the plate correctly; and all we can do is to make a sort of compromise between the two extremes. Plainly, if the foreground necessitate an exposure three or four times as long as that required by the distance the capabilities of any plate will be tried to their utmost, and the difficulty is increased in proportion to the normal sensitiveness of the film.

We have said nothing as to the comparative reliability of quick and slow plates from a purely chemical point of view; but in the main we agree with the opinion expressed by the Secretary of the Society to the report of whose meeting we have already alluded. It is, of course, an undoubted fact that the more sensitive we make our preparations the more delicate become the operations involved—not only in the preparation, but also in the development, of the plates; and that a trivial want of care, which may not affect a slow plate, will be sufficient to entirely ruin one of the ultra-rapid class. We have little doubt that much of the character of unreliability which rapid plates have acquired is to be traced to carelessness, and we therefore refrain from urging this as a further objection against their use.

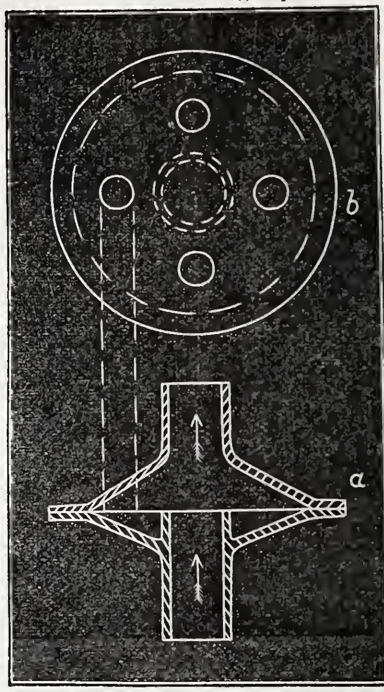
We conclude by repeating that we fully recognise the advantage which extreme rapidity gives for special purposes and under suitable conditions; but in the ordinary practice of out-door photography the conditions are not such as conduce to the production of the best results, either as regards quality or reliability, when very rapid plates are employed. In saying this we do not advocate a return to exposures such as prevailed ten years ago, when plates were in vogue which might receive five minutes or half-an-hour, as might suit the convenience or judgment of the operator. An exposure of from thirty to forty seconds is not an outrageously long one, and plates of that degree of sensitiveness may be easily prepared possessing sufficient "latitude" to remove all difficulties. When, however, the time is reduced to six or seven seconds it becomes "kittle wark."

OXYHYDROGEN EXPLOSIONS.

Several years ago our attention was specially directed to the subject of explosions arising from the intentional or accidental admixture of oxygen and hydrogen gases. One evening, about sixteen years ago, a life very precious to the world of science was nearly sacrificed to such an explosion; and, in consequence, we were requested to devise such means as would effectually prevent the recurrence of an oxyhydrogen explosion, no matter whether originated by accident, carelessness, or design.

This resulted in numerous experiments, the outcome of which was a valve by which safety was ensured to such an extent that the utmost ingenuity of ourselves and friends quite failed in the bringing about of conditions under which an explosion was possible. Among the conditions adopted was one which must be considered as affording a crucial test. It consisted in making use of a small, wedge-shaped gas bag, the top and bottom of which were made of wood, and kept apart by a strong spring, the force of which was entirely overcome by the contrary action of a spring still stronger. This bag, or reservoir, was charged with a mixture of oxygen and hydrogen, the proportions being those which theory and practice had decided would cause, when inflamed, the most violent explosion. One of the safety-valves having been interposed between the bag and the lantern burner, the latter was lighted, and when burning at its best the pressure upon the bag was suddenly removed by the pulling of a string, which also immediately brought into full action the spring inside, causing the flame to be sucked back into the bag, which, owing to the automatic action of the valve, it never reached. As full particulars, with several diagrams of the various forms of valves we adopted, were published a few years ago in one of our Almanacs we shall not here enter into further details in connection with these safeguards.

This subject is revived owing to our having received from Mr. W. J. Chadwick, of Manchester, a "back-pressure valve" he has devised and which he has rightly conceived would interest us. It consists of two obtuse conical discs firmly screwed together, between them being fixed, by the margin, a disc of oiled silk that presses very slightly against the end of the pipe through which the gas is admitted, the pressure of the gas, however, being sufficient to force the silk away from the end of the tube, thus allowing the gas itself to pass onward through several apertures cut between the centre and the margin of the pliable disc. The valve is shown in section at *a*, *b* showing the oiled disc.



Singularly enough an oiled-silk valve was one of the first kind we adopted in the experiments of sixteen years ago; but after a brief trial we abandoned it in favour of those constructed entirely of metal. It is, however, only just to Mr. Chadwick that we should state that his method of utilising the silk is quite different from and, we may add, superior to that which we adopted. We believe it to be a valve that will work with certainty; and we recognise in it an additional aid to those appliances by which an explosion in connection with the exhibition of the lime light will soon become a thing of the past. Even now it is very rarely we hear of such a casualty; with ordinary care, coupled with the use of a safety valve such as that now or formerly described, such explosions will be rendered quite impossible.

ART EDUCATION FOR PHOTOGRAPHERS.

The profession of photography is increasing in importance daily in the estimation of the public, and its ramifications are extending so far beyond what its sanguine professors could have anticipated twenty years ago that it behoves all who practice it to endeavour to preserve and increase the hold it has universally obtained. To attain this object nothing can be more desirable than the sedulous cultivation, in every direction, of the artistic perceptions of all connected with the art, and, above all, to train the mind and, if possible, the hands of those members who may now be said to be graduating—the apprentices and all those younger students of what is already an important profession—who are not too old to take up a systematic course of art training. We would earnestly urge upon every such student the great advantage to him of a few years' attendance at one of the many art schools which, in connection with the South Kensington Museum, are to be found in every town in the kingdom.

The advantages of an early training in drawing, with its natural sequence of advanced study in painting, &c., are conspicuous, and scarcely need to be here enumerated; and there is little doubt—to look upon the question for a moment in a sense outside our present scope—that an assistant so trained would command a far higher salary than one whose abilities had been less cultivated. We suppose we may take it for granted that the bulk of those who take up photography as a means of livelihood have some fondness for art, and nothing is more likely to increase their aptitude for it than the careful training afforded by those "schools of art." Long as they have been established we have had means of observing that they are not, by any means, universally understood nor their advantages known, and we have taken the present opportunity of bringing the great advantages they offer under the more immediate attention of the whole body of photographers. We sincerely and earnestly hope that all employers may point out to the younger members of their staff the efficient and cheap means of education existing close at hand.

These schools, as we have said, are to be found in almost every town of importance in the kingdom. The fees are always very low, something like sixpence a week being a fair average for the public classes, with the advantages of the supervision of a properly-trained and qualified master, the surroundings of artistic accessories, and being in many cases in connection with collections of examples of the highest class of art in painting and sculpture. Not only are the fees low, but there are annual examinations in which all pupils who have passed a certain stage of proficiency, irrespective of there being others still more skilful, obtain prizes of real value.

There are, also, for pupils who have shown application, and who possess sufficient merit, "prize studentships," the holders of which receive tuition for a certain period without payment of any fees. For more advanced students there are in the annual exhibition of their works bronze medals given, obtainable even for work so simple as outline drawing or simple examples of black and white chalk, if of sufficient merit. The recipients of these bronze medals are again eligible for a limited number of gold medals.

Then, again, every year there are a certain number of national scholarships awarded to students who have shown a certain considerable amount of talent. These scholarships include a payment of, we believe, fifty pounds per year and free instruction at the head school at South Kensington. Many of our readers may say—"Oh! we have not time to bestow in order to become so clever as all that." We would, however, point out to them that many of the most successful students at these schools have been working men who have wrought hard at their trade all day, and then received no instruction but such as was imparted at the night classes. There is no reason why any photographer should not attend and do the same, possessing, as he must do, advantages in the shape of association with art of some sort—though often, we confess, of a rather debased type.

A great advantage of these schools is the opportunity they afford for the discovery and education of latent talent. Many a student who had started life in a more humble capacity has, through the instrumentality of their teaching, been able entirely to give up his first trade, and become dependent upon art alone for an income—in many cases, within our own knowledge, a handsome one. Some artists of high eminence, starting life as mere handicraftsmen, have, through these schools, been able to obtain artistic knowledge side by side with the practice of their own bread-winning trade till they could give up the latter entirely. For example: one of the foremost sculptors of the day began life as a working stonemason, and, going to the school of art night classes in his own town, was gradually able to develope the talent he possessed and make it the stepping-stone to eminence and fortune.

With such examples as these before them we urge upon all young photographers to study drawing as much as possible; and, if they cannot attain the eminence we have described, they may yet advance themselves in artistic knowledge, and acquire the ability to show in their photographs the advantage of mental cultivation.

A recent writer in *Anthony's Photographic Bulletin* has revived the old idea of increasing the sensitiveness of silvered paper by treating it to a preliminary exposure sufficient to faintly tint its whole surface. The experience recorded by the writer in question is so decidedly in favour of the alleged accelerating power that, if it be verified by other experimentalists, few, we imagine, will refuse to accept the innovation as a real aid to the printer, especially during the dull winter months. The somewhat common practice of tinting the paper by exposure to light, in order to "soften" harsh prints, is not to be confounded with the accelerating effect obtained from the same cause. The tint thus produced is merely useful in lowering the too-staring brilliancy of the high lights of the picture without materially affecting the half-tones and shadows; and, though wrong in theory, it answers tolerably well in partially hiding a defect which cannot be altogether surmounted. For this purpose, too, it is immaterial whether the tinting be done before or after exposure; but, in order to secure the alleged acceleration, it is imperative that it precede the printing. In this respect it differs from the kindred employment of auxiliary exposure in the camera; for, as is well known, a variety of opinions exist as to whether the best result is obtained when the auxiliary lighting is given before or after or simultaneously with the camera exposure, or, indeed, whether any tangible result is secured at all. Theoretically, we presume, the principle is the same in either case, and is based upon the supposed power of an infinitesimal exposure to set up an altered state of the sensitive surface in which, though the change may be invisible, it is capable of being impressed by rays otherwise too feeble to produce any visible result. It has been argued that the effect thus obtained amounts to nothing more than a general fogging of the picture—to so slight a degree, however, that while noticeable in the weaker details of a negative (or in the lights of a positive) it is indistinguishable where the deposit is denser. But the experience of the writer in the *Bulletin*—that the tinted paper gave an impression through a mask of yellow paper, while the untinted portion, with a similar exposure, remained unchanged—points decidedly to some specific change wrought by the preliminary exposure. We have carefully repeated the experiment described, using a portrait negative and a mask of thin orange paper; but beyond a slight degradation of the whites in the tinted portion we have been unable to detect any difference. In no case did the mask "print through" on the tinted half of the paper until the same occurred upon the shaded portion. A band of the same yellow paper upon which was pasted a narrow strip of opaque cardboard was substituted for the negative, and a piece of partially-tinted paper exposed until the outline of the cardboard became visible, which occurred simultaneously upon the tinted and untinted portions. In its earliest stages the impression was stronger upon the tinted half of the paper, but in no case could we find that it made its appearance sooner on that portion than on the other. Our experiments so far fail completely in corroborating the statements contained in the *Bulletin* article.

DOUBLE FILMS, AND ALKALINE DEVELOPMENT.

I have experimented, as proposed, on the reduction of silver bromide in contact with metallic silver by the alkaline developer, and the theory lately proposed by me has been confirmed to some extent, though not so fully as I could have wished.

It does not appear to be worth while to go into the details of the manipulations, unless Captain Abney should secure other results; it will suffice to say that the exposures were made behind a glass graduated by strips of thin paper, so that the negative contained broad spaces of tones of varying degrees of depth.

When a plate is developed and, after fixing, washing, and drying, coated with a very thin alcoholic solution of gelatine, followed, after drying, by a coating of collodion emulsion, a great accession of density in the high lights is the result of applying the alkaline developer, the reducing action taking place very rapidly in the unexposed bromide. The superposed bromide appears to be reduced in proportion to the reduced silver immediately under it. It does not seem possible to reduce entirely a thick film of bromide lying on a delicate tone, however prolonged, in reason, the process of reduction may be. This is a point which to me seems difficult of explanation.

A plate which has been exposed through the back and then developed from the front in the usual way does not, in my hands, gain in density over a plate exposed in the ordinary way; yet here we should have unaltered bromide superposed upon light-altered bromide, which latter would be reduced to metallic silver by the developer. Why is the unaltered bromide not in the position of that in the first experiment?

It, moreover, appeared difficult to secure reduction in the upper unexposed film when the latter was placed in contact with an exposed, but not developed, film. The development is slower in the lower film, so that there may be less detail. It seems probable that the upper film raises an obstacle to the easy action of the developer on the exposed, but not developed, film; and until this latter has had all its sub-bromide and bromide under the influence of the sub-bromide reduced to the metallic state, reducing action does not commence in the film above.

The following is an extract made from notes jotted down during the course of the experiments, and will introduce the last experiment I shall quote:—

"There seems to be a tendency to *upward* reducing action, as a half-tone does not in ordinary practice continue to be added to by downward reduction after the development proper is finished, though the developer must surely be able to reach the glass. On the other hand, a bromide film superposed on a developed film is reduced considerably. Still it is difficult to say whether, in the case of the ordinary development of a film, an equivalent amount of reduction does not take place in the unaltered bromide. It would be advisable to try the effect of developing and fixing a plate, now coating one half of it with gelatine solution, followed by emulsion, and then transferring the film with gelatinised paper. Then, after drying, to moisten what was the *back* of the developed film with alcohol and apply the alkaline developer, taking care not to wet the back of the paper; then to fix, when any development downwards would be made apparent."

I carried out this experiment, and cut the transferred film in half for comparison. It must be remembered that the tones in each were alike. The developer was allowed to remain for *fifteen minutes* on the film, the sides of the paper being turned up so as to form a dish. At the end of this time the gelatinised paper was stained brown; the developer was washed off, and the film was fixed with hypo. *No gain in intensity was apparent*, yet the developer must have permeated both films in order to stain the paper.

My theory—that the reduction proceeds upwards in unaltered bromide—seems, therefore, to receive some confirmation. I shall, however, await with much interest Captain Abney's further experiments. HERBERT B. BERKELEY.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

My breath has been well-nigh taken away by the perusal of the five months' collection of applications for new photographic patents which has been published in the pages of The British Journal of Photography. It must be cheerfully admitted that it is of very great interest indeed to the photographic public to be made aware of the new inventions considered worthy of being secured by patent; but the interest would be enhanced if such information were afforded, at a subsequent date, as would throw light upon the future career of each invention whose birth has been thus heralded. Of any of those mentioned the thought will suggest itself—Does it contain the germ of a revolution? Will it be given up by its paternal relative ere it reaches the termination of the six months' probationary period allotted to it by the authorities? or will it enjoy an existence of three, seven, or even of fourteen years, according to the brightness of its prospects or the plethoric contents of the purse of its holder? Now, all these points might be ascertained by each reader for himself if in connection with the list of new patents applied for an addendum were occasionally published in which would be given a statement of those which had "lapsed" at either of the above-mentioned terminable periods, and of those which had been gazetted as having had a further term of existence granted by the payment of one or other of the definite sums of money which are payable as the condition upon which an extension to three, seven, or fourteen years is granted to these inventions. One use of such an intimation would be that many inventions now being paraded in the photographic world having the magic word "patent" attached thereto would be found to have forfeited all claims to patent protection perhaps several years ago. I am aware of one patent which lapsed nearly ten years since, but which is still imagined by many to be existing in full force. Indeed, it was only by accident that I was recently made aware of its demise.

Was Daguerre married? and *did* he leave a widow and "olive branches" to carry on his business? I put these queries *apropos* of the poem in memory of this *savant* which, through the enterprise of the *Practical Photographer* and the genius of one of its poetical contributors, has been allowed to see the light. Permit me to quote—

"He is the father of our art,
So faithful and sublime,
And many sons and relatives
Are following in his line."

Now if our art had only *one* father, was Daguerre that man? "It is a wise child that knows its own father," if we may reverse Shakspere's apothegm; but I don't think "our art" has yet shown any indications of its being the possessor of such discriminative wisdom. Then, as to the sons and relatives who are "following in his line," what line did *he* follow? and who are his sons and relatives? If he be the father of our art, and also of those who follow it, is it not cruel and unfilial in so many of the latter to ignore the existence of their sister? I have been puzzling myself to discover who the foregoing "relatives" are in contradistinction to the "sons," and I now conclude that the former are professional and the latter amateur photographers. But the advice given by the poet in his parting stanza, in which he takes a tender farewell of "Old Daguerre" and all his sons of care, is so excellent that I enforce it:—

"Be constant, just, and true,
Remember the old philosopher,
And art will follow you."

Whether Art is ever to "overtake" the sons of care who remember the old philosopher, and who she is thus guaranteed to follow, the poet sayeth not. On behalf of all lovers of the true and beautiful in poetry I beg to express the hope that we shall hereafter often meet with the effusive heart-utterances of Mr. Hamilton Gordon Wemyss.

I note the conversation between Mr. Mark Oute and his friend respecting the unwillingness of photographers to lend their negatives for the purpose of having enlargements taken. This is scarcely to be wondered at so long as human nature is what it is. Many prefer copying a *carte* portrait to running the risk of a refusal by the holder of the negative to lend it with that object in view. The following is the method adopted by a photographer of my acquaintance, who is very successful in copying paper prints. Having a strong plate of colourless glass a little larger than the *carte* to be copied he applies glycerine to one of its surfaces, also smearing over the face of the print with glycerine. He then brings the two coated surfaces into contact, places a stout plate of glass behind, and inserts the whole in a frame similar to a *carte* printing-frame, a strong pressure being applied to the back by means of screws. By this arrangement the texture of the paper is almost obliterated; and, owing to the print being thus placed in optical contact with the colourless glass in front, it is rendered very soft and delicate, and brought into a condition eminently fitted for copying purposes. The only precaution necessary in making the copy consists in subjecting the *carte* to a front light. In this way may be produced negatives which will bear enlarging very well. I do not say that such negatives would answer quite as well as the originals; but if a good print has been made use of for this purpose the enlargement will be so good as to convey no idea of the method by which it has been produced. I have several magic-lantern transparencies which have been obtained from paper prints by the method described, and they stand being shown upon a twelve-feet screen without the appearance of texture, hardness, or want of sharpness; and what more is required?

* Concluded from page 316.

BABIES AND STUDIOS.

I am very often asked to give some particulars of "how I do it" when the piles of baby pictures which are generally in hand at my studio have been looked over either by admiring mothers or curious photographers. If I were to reply truthfully I should say by the exercise of the utmost patience and the most complete self-control. When once a child enters my studio its fate is sealed—it is bound to give in. My present studio has been built over seven years. During that period I have had only one baby sitter brought into it of whom I did not get a picture before it left. I do not mean to assert that all have been good pictures, nor that I should let an infant be taken into it in a thunderstorm; but I do assert that, with the one exception I name, by dint of patience, tact, judicious selection and arrangement of light, and having my chemicals in the most exalted state of sensitiveness, I have always "hit them off" by one means or another.

Often it takes a long time to get round some particularly beautiful and correspondingly bad-tempered ("high-spirited" the mothers call it) little atoms of humanity; but, as I always arrange for an extra length of sitting for this class of subject, I have not found that difficulty insuperable.

One of the most important points in this sort of work is the treatment of the parents or friends of the tiny sitters, who will insist upon clapping their hands or petting the child at the most inopportune moments; or, if old enough to understand, telling them to sit still, or to be quiet, or be a good child, and so on. Unless under exceptional circumstances the photographer himself should do all that is necessary in the way of attracting, as the action of uncapping is so dependent upon that of amusing the sitter that the two form part of one act, and cannot be separated with advantage. Hence I always gently but firmly insist upon the sitter being left in my hands; if I do want help I ask for it. I further inform the parent, or whoever has the child in charge, that it must not be told to "sit still," "not to move," &c., and I always check any tendency to speak of "taking" or "photographing." These are mysterious words, too suggestive of tooth-drawing, or having about them a gentle adumbration of bunches of birch.

First thing of all the child's confidence must be gained, the general mode of doing which is to chuck it under the chin and say "well, little darling!" this being followed, in nine cases out of ten, by a pout and a shrinking which is never quite got rid of during the sitting, and occasionally it ends the matter at once by the establishment of a series of finely-graduated howls which never cease till the outer door is reached. This is not the way at all. A child's nature is a perfect study, and *it should never be spoken to or looked at* upon its first entry, but its attendant addressed, and perhaps a slight remark made as to the toys in the place. The little ladies or gentlemen generally prick up their ears at that, and if one or two toys be brought out with discretion it is usually only a matter of about five minutes before a friendship is cemented, and the two—that is, the sitter and myself—are either playing on the floor or still more advanced towards the posing. Toys in abundance are a necessity, and the power of mimicking the noises of cats and dogs, &c., is particularly useful. Loud noises, whistles, &c., are vicious in principle; they lead to such open-eyed expressions of fear or wonder that they are utterly objectionable. A musical box I find a very useful aid, some children being quite entranced, as it were, with it; while others, again, do not appear to regard it in the slightest degree. I find a good-sized india-rubber ball will attract oftener than anything, and, owing to some (to me) inexplicable psychological combination, toys thrown in the air will nearly always cause laughter.

Very young babies—and I have taken them from a fortnight old—of course require different treatment. Plenty of life and activity and colour is what they like. A musical box half wrapped in a coloured shawl and waved about, or a twirling feather-fan, &c., &c., I have found very useful. When they are very young, of course, they cannot be attracted by either noises or sights started any distance from them. The plan then is to go close up to them with the bright object and retire quickly; their eye will generally follow the attraction long enough to get an exposure. It is, perhaps, scarcely necessary to say that when two or three children come together they should be introduced into the studio one by one, as otherwise the toys and the little tricks and dodges to attract their attention become stale, and when their turn comes they are "old birds" who are not to be "caught with chaff."

One word about the head-rest. When about to use it take *Punch's* celebrated advice—"Don't"—except in the case of children not too young, such as can thoroughly understand that it is nothing to hurt them; and even then it requires most dexterous handling and delicate adjustment to avoid that unnatural constraint of pose and appearance which, bad enough in an adult, is simply detestable in children, whose posing and arrangement should suggest everything that is light and free.

With regard to the form of studio most adapted for the purpose, it is quite immaterial so long as there is plenty of light; for it can then always be lessened, if required, by curtains, and, above all, so long as there is power to use a south light. The quickest exposure cannot be obtained unless there is an all-round light, one side being the south. It may be softened and diminished as much as is considered necessary; but for exposures such as I give—often less than a quarter of a second—a south light is a *sine quâ non*. Its excessive brilliancy can always be subdued when it is found that the sitter is made to frown and draw up his or her mouth by its too great brilliancy.

With regard to chemicals: I have little to add to what I have written about them in former numbers of this Journal in this connection. The purest materials must be employed. It is, doubtless, an advantage to be able to test everything in one's own laboratory, but it is not a necessity; the dealers supply the best of everything if paid a fair price. A bath made of pure water and silver and a newly-iodised collodion only faintly tinged with colour are necessary (the latter should be tested for cleanness of working and rapidity, there being decided differences in the latter respect among the various commercial collodions); a strong developer—these three things seem to be all that is required with the exercise of tact and skill. But I am bound to confess I find that constant practice in this work seems to give one a power over one's subject which the most skilful beginner does not obtain. No one should attempt this fascinating branch of photography unless he is fond of children and possessed of unbounded patience. G. Watmough Webster, F.C S.

ILLUMINATION BY ELECTRICITY.

[Condensed translation from the *Revue des Deux Mondes* for the *Journal of the Franklin Institute.*]

The Gramme machine, as the electric source, and the Jablochkof candle have made the application of electricity to purposes of illumination a fact beyond doubt.

The intensity of the moon's light is inferior to that of a candle, and incomparably more feeble than that of the sun.

The comparison of the electric arc to the sun, which is our highest conception of brilliancy, may be made in two ways—by the relative times required to produce equal photographic images, or by the direct measure of the illuminating powers. Fizeau and Foueault found by the first process that the power of the sun is only two and a-half times superior to that of the arc; the second method has proved that the carbon points with a powerful machine are equal to the sun in lustre. It is even probable that this limit may be passed, and it is not strange if it be remembered that our sun does not occupy the first position in the universe. It is a star already old, the cooling of which is considerably advanced, and whose yellowish light begins to approach that of terrestrial flames.

In quantity and quality the electric light greatly exceeds all flames, and in brilliancy it approaches or even surpasses the sun. It is precisely this immense profusion of illuminating power that is urged against the electric light. It is said to be exaggerated, to exceed our requirements, and that it ought to be divided, but it is indivisible.

It is true that the electric light is dangerous, like that of the sun; we may be illuminated by it, but we should not look at it. But is it by any means certain that it cannot be divided or so reduced in lustre as to be rendered tolerable?

Nothing is easier than to reduce its lustre to any degree that may be desired; it is only necessary to cover the arc with a large opalescent globe. The latter hides it, and receives all of the rays and dispenses them precisely as if the globe itself were luminous. It replaces the original source, at the same time increasing the dimensions, and if it be ten thousand times larger it reduces the lustre to the ten-thousandth part. It is true this process absorbs and wastes a notable portion of the light emitted, but where the electric light can be adopted this is of but little importance. The division of the arc can easily be accomplished by the use of the alternative currents long since devised by Le Roux; for, when the alternations succeed each other at intervals of one-twenty-fifth of a second, the extinction ceases to be perceptible, and the effect is that of a continuous light. The Jablochkof candle, when the thickness and distance of the two carbons are diminished, permits a still further division, so that each candle may equal but fifty Carcel lamps, and a number of these candles may be placed in the same circuit.

The division may be carried still further, as shown by a new and remarkable experiment by M. Jablochkof. He prepares an immense condenser composed of two tinfoil surfaces, separated by oiled silk, and folded as the condenser of a Ruhmkorff coil. The surfaces are connected with the two rheophores of an alternating current machine, so that a large space is presented on which the electricity may accumulate and condense until, the direction of the current changing, each disappears to be replaced by the opposite electricity, which, in its turn, undergoes the same condensation. It is evident that these conditions should greatly modify the electric circulation in the wires, and experiment confirms the assertion. When the current is broken brilliant sparks are produced, flashing like fire, and enveloped in a very luminous yellow flame, at the same time accompanied by a sonorous humming sound, of the same pitch as the noise of the machine, which proves that the periodic intervals of the production of the sparks are the same as those of the formation of the currents. This experiment leads to one practical result: it is that by introducing a condenser into the circuit the number of candles that the latter is capable of sustaining is doubled, but the light of each candle is, of course, reduced one-half. All is reduced to a greater division of the illumination. It is not desirable to go beyond this point, for the Jablochkof candle, with the condenser, gives a light equal to twenty-five Careel lamps, and, in order that electricity may be adopted as a source of light, its power must be equal to that of at least twenty Carcel lights.

M. Jablochkof made another interesting experiment. He passed the alternating current through the interior wire of a Ruhmkorff coil, producing in the exterior wire induced currents also alternating, but of greater intensity, which are capable of diffusing upon the edge of a thin piece of kaolin, illuminating it, and maintaining the incandescence as long as may be desired. It is a beautiful physical experiment, but its practical application is doubtful.

The light of a gas flame is orange yellow when compared to that of the electric light. That a light may be applicable for purposes of illumination it is necessary that it shall contain the seven primitive colours of the spectrum in certain proportions. All luminous bodies do not contain these colours in the same proportions. The electric arc produced between silver and carbon contains only two green bands, and if the silver be replaced by other metals the spectrum obtained is always formed of brilliant lines separated by wide, dark spaces. These lights are very incomplete, and would not, in any case, be used for illumination.

The spectrum of gas and oil flames are continuous. The red, orange, and yellow are very abundant; there is but little green, almost no blue, and little or no violet. These flames are rich in colours, but slightly refrangible, which gives them their orange tint, poor in highly-refrangible rays, and destitute of indigo and violet. That of which they possess too much, the red, may be removed; but it is impossible to add to them the indigo and violet which they lack, and this is the cause of their inferiority. The electric light is more complex; it proceeds at the same time from the carbons and from the arc, and differs according to the one or the other of the sources. That from the carbons is white; it is absolutely the same as that of the sun, and contains all of the simple rays in the same proportions. It is complete and perfect, and replaces daylight without any modification. It is not the same with the light from the arc itself; it is violet blue, and its spectrum tends altogether towards the most refrangible colours. It is the opposite of gas- or lamp-light; it contains little red, much blue, and a large excess of violet. It is this light of the arc which gives to electric illumination the bluish tint which has been objected to with reason. But it is a fault of excess which can be remedied, for while the missing rays cannot be added to gaslight the superfluous rays can be removed from the electric light. The eye receives the vibrations of the ether which constitute light just as the ear receives sounds transmitted by the air, and ceases to be conscious when the vibrations become so rapid or too slow just as the ear ceases to hear notes too acute or too grave. But such extreme vibrations exist; there are rays below the red and beyond the violet, both of which are imperceptible to our eyes. The first are the heat rays, so abundant in the spectre of flames; the second exist in large proportion in the light of the arc, and are those which it is important to recognise and remove. Their existence may be proved in two ways—first, by receiving the spectrum upon a photographically-sensitive surface. The image formed in the red is very feeble, while those formed as the violet is approached become better and better; but the action does not stop at the violet. The photographic intensity is extended and increases beyond the violet, which proves the existence of ultra-violet rays of rapid vibration which our eyes cannot recognise, but which are eminently fitted for photographic action. The second method is different. If a solution of quinine sulphate be spread with a small brush upon the spectrum from the red to the violet no effect is perceived in the red; but after the blue a whitish tint marks the path of the brush, and this is increased and becomes most brilliant in the rays which are beyond the violet. The quinine sulphate has, therefore, the property of changing the blue, violet, and ultra-violet rays into white light, and, at the same time, it renders visible and useful radiations which the eye could not perceive, and adds them to the available light.

Uranium glass and many other substances act in the same manner, and present the means of suppressing the rays which are objectionable in the electric light. This suppression is necessary in other respects. These rays are said to attack the humours of the eye, and to be the origin of grave diseases.

But the electric light has its faults—one especially, which will exclude it from many places. It produces a grave, continuous note like the buzzing of a swarm of flies or an æolian harp. It is not a disagreeable note, but it becomes monotonous. It is produced by the succession of alternating currents lighting and extinguishing the arc at each change of direction, with a little noise each time. As this noise is produced at equal intervals it becomes a tone, the same as that produced by the machine, and when the candles are placed in globes the latter become resonators, and increase the sound. The Gramme machine is the only one which furnishes a silent light, because its current is continuous in the same direction.* The electric light, however, does not vitiate the atmosphere, and produces very little heat.

In ordinary flames, the production of light is a secondary phenomenon which accompanies the chemical combination of the combustible with the oxygen of the air. This combination is doubly objectionable, removing the oxygen from the air, and replacing it by vapour of water and carbonic acid gas. The latter, although not as dangerous as has been believed, has not a good reputation, and the best that can be said in its favour is that it does not kill. The electric light has the decided advantage of not altering the respirable medium. Chemical combination has still another inconvenience: with the light it developes such an amount of heat as sometimes to render work-rooms almost uninhabitable.

On the contrary, the electric arc does not heat. This appears astonishing at first, for all bodies fuse or volatilise when introduced into this arc. But if a very sensitive thermometer be placed in the spectrum of the electric light it is found that there is no indication of heat in the violet rays; that in the green the thermometer begins to be heated, and that the temperature continues to rise as the red is approached, and attains a maximum in the obscure rays beyond the red. Now these heat-producing rays are by far the more abundant in gas and lamp flames, while the arc, which is the best test of luminous sources, emits the greatest amount of light with the least proportion of heat.

The exact cost of the electric light is yet a matter of question, but the Lontin Company furnish all of the apparatus, wires, lamps, &c., of which it retains the ownership, and demands fifty centimes an hour for the quantity of electricity, equal to 100 gas jets, on the condition of a guarantee of the use of a certain amount of light for a number of years. One of the proprietors of the Magasins du Louvre has authorised the statement that the apparatus of the Denayrouse-Jablochkof Company, in their use, gives more light than gas with thirty per cent. less cost.

* In the experiments made by the Committee of the Franklin Institute, it was found that all of the so-called continuous current machines produced some sound in the arc.

The fault has often been committed of attempting street illumination on the lighthouse system by a beam of light concentrated by reflectors, and thrown along the length of the street. Such experiments have only succeeded in blinding the by-passers and projecting behind them long shadows as black as open precipices. There are cases when such concentration is the only end that is desired. In workshops, it is only necessary that the workman shall have a clear view of the work before him. It is the same in dining-rooms, billiard-halls, reading-rooms, &c., and no one pays attention to the obscurity behind him.

It is different in depôts, theatres, lecture-rooms, and display store-rooms. In these cases a general illumination is required, coming from all directions, and lighting every side of an object.

When several electric lights are placed in a hall illuminated by gas the eye immediately experiences a sort of relief, both by the redoubled brilliancy and by the perception of colours, which were not before suspected; and, on the contrary, if the electric lights be suddenly extinguished the spectators are thrown into the comparative night of the old illumination.

The conditions of good electrical lighting must be determined by a study of the general illumination of objects during the day. When the sky is clouded the sunlight pierces the clouds as through a ground glass, and the whole sky is like an immense illuminated ceiling, radiating light from every point and in all directions. The objects illuminated diffuse in their turn the light which they receive, so that there is an inter-crossing of rays, producing the effect of a mean amount of light everywhere; this is *general illumination*.

Such is the model that must be followed. For this purpose the ceilings, walls, and floors must be illuminated that the diffused light may be radiated into the empty spaces; and, that the quantity may be the same everywhere, it will be necessary to multiply the sources of light. That the direct rays may not painfully affect the retina it will also be necessary to diminish their brilliancy by the interposition of ground glass and some fluorescent substance, such as quinine sulphate, in order to transform the violet and ultra-violet rays into white light. Lastly, and especially, it will be necessary to cover all openings by which the light may escape.

The exterior light enters by the windows during the day, and it is by them that the nocturnal illumination escapes. M. Jablochkof introduced electric lighting into the laboratory of the Sorbonne, and the feeble effect it produced was astonishing. This laboratory is covered with a glass roof, by which it is well lighted during the day, and by which it allowed the loss of at least one-half of the light produced by the electric candles. This wasted light illuminated the high walls of the surrounding buildings, and gave a brilliant but useless illumination in the court. A similar occurrence took place last summer on the occasion of an experiment attempted in the Palais de l'Industrie. All of the light had been concentrated in six lamps, far from each other; this was the first fault, which would have been avoided by distributing a large number of less powerful lamps throughout the immense building. Lastly, all of this light, instead of being directed towards the spectators by a well-combined system of diffusion, escaped through the vast glass roof, to be uselessly lost in the heavens. The experiment would have succeeded had the roof been covered with a thick white covering, destined to reflect back the light so prodigally wasted.

The same thing happens with gas, and will occur with electricity in the illumination of public places. All of the lamps waste half of their light in radiation towards the sky. A simple reflector would return it to the ground and double the illumination. J. Jamin.

THE BIG SHOW.

Boissonnas' Rapid Process. — Photography Used for the Illustration of Subjects.—The American Pictures.

Before leaving home "Boissonnas' extra-rapid process" advertisements had attracted our attention, and on the second morning of our stay in Paris we paid a visit to M. Klary, at 18, Rue Vivienne. We went with very much the same feelings as Charles Dickens stated that he felt on his way to New York. When the Yankee asked him what he was going to do at New York, he replied—"I'm going across to look at it, and if I like it—I'll buy it!" That was just our position with regard to this process; we were going to look at it, and if we liked it we'd buy it. The testimonials were very startling from the shortness-of-exposure point of view—so short, sometimes, that I began to wonder if I would not come across one where the cap had never been removed from the lens at all. When reading them over I was reminded of the Irishman who, when buying the stove that saved half the fuel, thought that he might as well have two of them, and then he would need no fuel at all.

The greatest feat in the published list is that of one gentleman who, when a heavy fog was on and the light so bad that working with ordinary formulæ it would have required an exposure of from twenty to twenty-five seconds to produce a picture, "obtained a perfect negative by opening and shutting the cap of the lens as quickly as possible." Taking a fair average of the list, about one-fifth of the usual exposure is what is claimed for it. Under the conditions in which we saw the experiments, and to the best of our judgment — seeing everything around was strange—the exposure was about half the time the same subject would have taken with us at home and under our own conditions of working.

The light under which M. Klary worked was certainly superior to that which we, as a rule, have the opportunity of enjoying; and this advantage helped him in his exposures. We saw three plates exposed with four *cartes* on each plate (bust heads). The exposure given to each picture was one, two, three, and four seconds respectively on each plate as it was tried, and in each case the three-seconds' exposure was the finest picture. They were taken with a Dallmeyer's lens, three-inch diameter, full aperture. That it is quicker than our ordinary working is certain; for, although the three-seconds' exposure was by far the best, the one-second or two-seconds' pictures might have done good service if one were placed in the position that such were the only things obtainable at the time.

We resolved to wait until the process was tried on our own ground, and under the conditions which we ourselves would have to work it, before purchasing; and if, under these circumstances, it should reduce the exposure to one half the usual time M. Klary will find many purchasers. Should M. Klary think of paying this country a visit I have no doubt he will receive a very hearty reception and a fair field for his demonstrations.

After leaving M. Franck's studio we went on to the Exhibition. The manner in which the photographs were scattered all over the building was, to say the least of it, puzzling. Each set was to be found in its own section or country certainly; but then the distance between each set of pictures was considerable, and in many cases not an easy matter to find out. Suppose you wished to make a comparison of works that you might think similar in value and merit, the chances are that you might have to walk back a mile to do so, and you would fail to be able to judge then as you might have done had you been able to walk out of the one section into the other. But even this evil, if it may be so called, did not exist without a corresponding amount of good to the investigators; for in our hunt for the next section we invariably dropped upon whole sets of photographs, and in many cases fine pictures, illustrative of machinery, mining operations, architecture, furniture, soft goods' productions, views of countries and costumes strange to us—from the apparatus used in preparing the dead bodies for inspection in the Morgue to the newest designs in life-saving apparatus at sea. These collections of pictures speak well for photography being used as the future means to be employed in giving truthful illustrations of all kinds of subjects. To see the thousands on thousands of photographs that are exhibited all through the building for the illustration of subjects simply from a commercial point of view foretells a great future for our baby art, which has yet to spread and flourish to the dimensions of full grown manhood, absorbing as it grows many of the methods now used in the manufacturing of pictures.

The pictures from Canada and the United States are pleasing examples of the general work that comes to us from "over the water," which is, as a rule, far above the average in commercial photography; that is, pictures that are really sent out to clients in contradistinction to those which are neither more nor less than show pictures made for exhibition.

Notman, of Montreal, shows work rich in tone and artistic in manipulation. The snow scenes of Henderson, also of Montreal, look so real they seem to cool you to look at them, and that itself is an advantage with the thermometer standing at a hundred degrees.

Sarony, of New York, from the samples here displayed, stands now, as in the past, unequalled in that style of portraiture which he affects. There is the indefinable feeling of art through all his productions which belongs to the man himself, and which never could be attained by careful manipulation alone.

Weston, of San Francisco, shows some pictures in a cut mount which he calls the "crystal scallop," for which he has taken out a patent. If it be the mount he means—and I could see nothing else about for which he could take out a patent—after inspection I must say I quite failed to see either its beauty or its utility.

Joshia Smith's case of bright-eyed little things—that mutely tell you with the smile of babyhood that they "came all the way from Chicago"—is a perfect poem framed. To stand at that case, letting your eyes wander from the one face to the other, thus studying the differences of expression—the thoughtful, the cheerful, the smiling, the laughing, all happily portrayed—it looks like an index to a hundred volumes of a hundred changeful lives.

I. Landy, of Ohio, has sent seven pictures descriptive of Shakspeare's "Seven Ages." He has, "at first, the infant, mewling and puking in his nurse's arms;"—and "then the whining schoolboy, with his satchel and shining morning face, creeping like snail unwillingly to school;"—"and then the lover, sighing like a furnace, with a woeful ballad made to his mistress' eyebrow;"—"then, a soldier, full of strange oaths, and bearded like the pard;"—"and then, the justice; in fair round belly, with good capon lin'd, with eyes severe, and beard of formal cut;"—"the sixth age shifts into the lean and slipper'd pantaloon, with spectacles on nose and pouch on side;"—"last scene of all is second childishness and mere oblivion, sans teeth, sans eyes, sans taste, sans everything." They form an excellent series of subjects, and are very cleverly treated.

Mark Oute.

FOREIGN NOTES AND NEWS.

Leipzig Training School for Retouchers.—Gilding Solution.—Dr. Liesegang on Mr. Bennett's Emulsion Plates.—A New and Expeditious Mode of Flattening or Retouching the Negative Film.—A Lead-Containing Negative Silver Bath.

A training school for photographic retouchers has just been started at Leipzig. The subjects taught include the following:—Figure drawing (heads), retouching of positives and negatives in oil and in water colours, chromophotography upon paper and convex glass, portrait painting, and, though last not least, the posing and lighting of sitters for photographic portraits. Ever since the practice of retouching negatives was first introduced there has been a never-ceasing wail over the want of skill displayed by retouchers. Their chief aim has seemed to be, not to modify the shadows and lines, which come out with much greater distinctness in the portrait than in the original, and to tone them down only so far as to make them true to nature, but to give to every face a marble-like texture, and to every cheek the roundness and smoothness of a billiard ball. The upholders of the legitimacy of retouching, on the other hand, maintain that retouching would be an unmixed benefit to the photographer in the hands of a properly-trained assistant; but, then, properly-trained assistants are scarce. If the Leipzig experiment be successful they may become more plentiful, though there might be more chance of success if the anatomy of the face were added to the subjects of study.

In the *Chemiker-Zeitung* Dr. E. Ebermeyer gives a formula for gilding metallic articles so as to look like polished gold by simply dipping them into a warm solution. Dissolve ten grammes of gold in forty grammes of hydrochloric acid and fifteen grammes of nitric acid; stew down, letting as much of the acid escape as possible; then throw down the gold as fulminating gold by means of spirit of ammonia; filter, and wash. In the meantime dissolve one hundred grammes of cyanide of potassium in as little water as possible, and then dissolve the gold upon the filter with the cyanide solution. Pour this solution again and again over the filter until all the brown particles are dissolved, when the gilding solution is prepared by the addition of one litre of distilled water. Into this solution, while warm, dip the metallic object to be gilded, and when drawn out it will have all the appearance of polished gold. The formula for silvering is as follows:—Dissolve twenty grammes of silver in sixty grammes of nitric acid, and precipitate with a solution of twenty grammes of caustic potash in water upon a filter, and wash with water; now redissolve upon the filter with a solution of one hundred grammes of cyanide of potassium in water; then dilute the whole to two litres with distilled water, and use like the gilding solution.

In the *Photographisches Archiv* Dr. Liesegang proposes to modify Mr. Bennett's developer for a properly-exposed gelatine emulsion plate thus—

Ammonia of 88°	1 drop,
Pyrogallic acid	1 grain,
Water	1 ounce,

mixing as much in these proportions as will cover the plate in the bath. When the plate is over-exposed take more pyrogallic acid, and when under-exposed less, but more ammonia.

From a series of experiments made with bromide of silver and gelatine, Herr R. Schlegel is of opinion that these plates give a much more correct proportion between the red and green parts than collodion plates, but that the yellow parts have less action on them. Herr Schlegel also found that when the light was dull these plates were of much the same sensibility as collodion emulsion plates, but that in bright light their sensitiveness far exceeded that of the latter.

In the same journal mention is made of a substitute for the retouching pencil when quick work is required, by means of which any given part of the face or hands may be made smooth and flat! M. Ducaisse takes a medium-sized sewing-needle, blunts and polishes the point of it, and then fastens it obliquely into a pencil-holder so as to form an angle with this handle. He then rubs with the side of the needle those parts of the face and hands of the negative which it is desirable to smooth, thus polishing the film and making it more opaque when looked through. The negatives work better gummed than varnished. This is art made easy with a vengeance! It should be said, in justice to the *Archiv*, that it merely mentions this mode of retouching; it by no means recommends it.

In the same journal there is also a formula for a negative silver bath containing lead:—Dissolve in a bottle capable of containing rather more than a litre forty grammes of white nitrate of silver in half a litre of distilled water, and then add carefully twelve drops of plumbic acetate.

On shaking the mixture the silver solution becomes milky. Meantime, in another bottle, dissolve forty grammes more of nitrate of silver in another half-litre of water, and add to the solution twelve drops of pure nitric acid. Pour the contents of the second bottle into the first and mix; the fluid will then become clear again. Then add ten c.c. of iodised collodion, sun the bottle for a few hours, filter, and the bath is ready.

This lead bath, says the *Archiv*, works very rapidly and seldom fogs; but gives very thin, grey negatives, such as are preferred for Rembrandt portraits. It has also the advantage of working well in the dull winter days, giving well-harmonised light and shade. Under ordinary circumstances its negatives may be powerfully intensified with pyrogallic acid.

TRANSATLANTIC NOTES.

Utica, Saratoga, and Albany are the subjects of the present instalment of *Notes*, although, were sufficient space at my command, each would furnish matter enough for several communications.

Utica, intersected by the Erie and Hudson Canal, is really a beautiful place. Free from the geometric regularity of most of the American cities, its tree-lined streets impart to it the truly American sylvan character, while the size and elegance of its suburban residences show that its people are prosperous to a degree unknown in similar cities in the old country. But their commercial prosperity is not the only, or even principal, quality on which the Uticans pride themselves, as they rank only second to Boston in their opinion of their culture and appreciation of science and art; and, so far as I have been able to judge, with quite as much, if not more, reason. Amongst many things of which the Uticans are justly proud not the least remarkable is their cemetery, and especially the fine conservatory connected with it. It stands on a hill about two miles out of the city, from which there is tramway communication every half-hour. The hill was originally covered by a primeval forest, and its principal beauty consists in the way in which considerable numbers of fine trees have been left to line the walks and overshadow the resting-places of the revered dead. The inclemency of the weather during some of the winter months renders the funeral ceremony always uncomfortable and sometimes impossible, and to obviate this inconvenience a beautiful conservatory has been erected near the entrance. Although it is called a conservatory, "crystal palace" would be a more appropriate designation. It is a beautiful, circular-roofed structure of iron and glass, both colourless and stained, fully stocked with the most choice exotics kept in perpetual bloom, and here and there song birds and birds of exquisite plumage disporting amongst the branches and sending forth their songs of gladness, imparting a life and vivacity to the scene that is charming. A large space in the centre is kept clear, in which the coffin, or "casket," as it is more generally called, is placed, with the mourners around it; and there is a gallery at one end for the accommodation of a choir, by which appropriate music is usually sung as a portion of the service. But probably the most interesting feature in this beautiful cemetery is what externally looks like a fine gothic chapel—the gift of one of the wealthy families of the city. The visitor is at first somewhat at a loss to know what purpose it is intended to serve, as although such buildings are to be found in most cemeteries they are always used for the services connected with funerals; but in this case these are amply and much more tastefully provided for in the conservatory. The mystery was, however, solved when the obliging keeper of the cemetery was interrogated; and it turned out to be a receptacle for those who die during the winter months, when the ground is frozen to such a depth or the snow is so thick that graves cannot be opened. Access to the interior is gained by a massive door at the end of the building, and the "dim religious light" passing through the stained glass shows only an empty central aisle with a row of panelled doors on each side. On opening one of these doors the recess is found to be divided by shelves into bins like a wine-cellar, and each bin contains an oblong box of white pine, on the end of which is fastened a card bearing a name and date, and inside of which box is the coffined body of the deceased, awaiting a convenient time for proper interment. The chapel contains altogether four hundred and twenty such bins, and there were at the time of my visit over four hundred bodies awaiting burial, all of which, according to cemetery regulations, must be buried before the first day of June.

Here, as in places nearer home, there seem to be difficulties in the way of insuring negatives and photographic material against fire, and I was surprised to learn that as much as from three to five per cent. was frequently asked by insurance agents. Of course, rather than pay such heavy premiums many do not insure at all, while some only do it for a "quarter," or from three months to three months. Such a method involves frequent omissions, and as a natural consequence, when a fire does occur, it not unfrequently happens just while the stock is uninsured. Why such high premiums should be charged where the arrangements for extinguishing fires are proverbially so perfect I cannot understand, and I am sure that some of our English or Scotch companies might do worse than establish branches here and in other large towns, as, if they would grant policies on anything like the rates charged at home, they would command a large amount of business.

I am not much acquainted with fire-brigade arrangements in the old country, but probably a brief description of what I saw in Utica, Flint, and several other places, and what I know to be general in almost all such towns in the States, may interest the readers of the Journal. The town is divided into districts, in each of which there is a suite of buildings, including a comfortable mess-room for a number of firemen, who live on the premises, and dormitories, with beds, by the side of each of which the fireman's dress is placed ready to be jumped into at any moment. A steam fire-engine is always at hand, with water at the boiling point, and with firewood and coal laid ready for ignition; there is also a stable with a pair of highly-trained horses prepared to draw the engine to any place where its services may be required. Each station is in electrical communication with signal-boxes all over the city, and by the breaking of a pane of glass and the pressing a button at any one of them information is instantly flashed to each of the watchmen on duty. Equally simple and prompt is the result of the action taken by each of such watchmen on the receipt of the electric signals. He pulls a cord which hangs convenient to his hand, and the single pull strikes a powerful gong, the noise of which at once awakens the sleeping firemen and warns the horses that the time for action has come. It at the same time liberates the springs by which the door of the stable is kept shut, and also unhitches the horses. In short, a single application to the bell-pull awakens the men, opens the stable doors, and liberates the horses; and so well trained are both men and animals that within *a few seconds* after the signal of a fire has been received each is at his assigned post, and although the fire may be only in the next street steam at a pressure high enough for effective work is available by the time the engine reaches it.

I regret to say that photography in Utica is not in the position that from the taste and culture of the Uticans we might expect it to be. There are no lack of photographers, but, so far as I could see, there was only one who really did good work, and he certainly had more than a fair share of what was going. His studio was one with the ordinary large top light, and his arrangements generally would not in Europe be considered conducive to the production of high class results; but by the liberal use of hand and other screens he simply and rapidly produced negatives that would do credit to the best artist in any country. Unlike Americans generally, he evidently prefers warm colours, and was toning silver prints a warm brown. He was the only licensee of M. Lambert that I had met in the United States who seemed determined to thoroughly work the process to its entire extent, and his walls bore ample evidence of much patient perseverence, although he had not sufficiently mastered the details to warrant him in abandoning silver printing entirely, though he said that the hoped in a short time to send out nothing but carbon prints. In common with many of his brethren in the profession, he assured me also that he envied photographers in Britain, who could always find reliable collodion and other materials as articles of commerce, while much of his time was consumed in making them; but I strongly suspect that there is a good deal of prejudice in connection with this matter, as since then I have again and again had satisfactory evidence that thoroughly good and perfectly reliable collodion is as easily obtained in the American as in the English market. Far be it from me to do anything that would injure the business of one from whom I received much kindness, yet I cannot avoid saying that I think there is in Utica a good opening for any able photographer who would go in for high class photographic work.

From Utica to Saratoga is a long distance, but after leaving the former the latter was our next resting-place; and probably no two places in this great country are more unlike each other, or, perhaps, it would be more correct to say that Saratoga is unlike any other place in the Union. It is a city of huge hotels, big churches, and a number of shops out of all proportion to the number of its stationary inhabitants, the result being that for at least eight months of the year the principal hotels and most of the shops are shut, while the churches are much more than half empty. Saratoga during the season is, perhaps, one of the gayest towns in the world, and possesses some features that are altogether unique. It owes its origin to its possessing several mineral springs that are neither better nor worse than hundreds of others to be found in this as well as other countries; but a visit to Saratoga has become the fashion, and as Americans do everything on a gigantic scale this their favourite watering-place is no exception to the rule. How gigantic the scale is may be inferred from the fact that at least two of the hotels—the "United States" and the "Union"—can each accommodate something like three thousand guests; and not only are they generally full, but they frequently have to call into requisition private lodging-houses to accommodate their surplus guests. If it be borne in mind that the average charge for board is a guinea a day, it will be seen that these two hotels alone must take considerably over £500,000 during the season. It would be difficult to form anything like a correct estimate of the actual sum expended in Saratoga by the wealthy Americans who year by year spend a portion of their time there; but observation leads me to the belief that these two monstre hotels cannot represent more than a fifth of the boarding-house power in the place, and if that be nearly correct a sum of not less than two millions and a-half sterling is spent in Saratoga alone on seeing and being seen. This is certainly a large sum, but the proprietors in Saratoga make the most of what they have to show in everything except the town itself. The streets are badly paved, or not paved at all, and the buildings, the large hotels excepted, are very deficient in architectural beauty; but this is amply made up for, or supposed to be, by the care lavished on the park, in which the principal springs are situated. Good taste, however, does not always go hand in hand with lavish expenditure. In this case the effect is most wretched, the gaudy decorations in glaring primary colours giving an impression that it is part of a gigantic circus, or other show, and that Barnum—who, by-the-by, is a frequent visitor—had been employed to exercise his genius in making it what it is. Outside the town the roads are kept in first-rate order; and as every American who can afford, and a good many who cannot, drives his *span* or pair of horses, care has been taken to make the most of what is to be seen within the radius of a driving distance.

Of course, as my time was limited, I could not do much in that way, but certainly no one should go to Saratoga without visiting the geyser springs and the very beautiful lake. These really wonderful springs are about two and a-half miles to the south of Saratoga. They are each covered by a neat building, and play continually, each a perpetual fountain of highly-charged mineral and aerated water, which has already become famous all over the United States, and is sent off in thousands of dozens in clear, green glass quart bottles at the rate of about twelve shillings per dozen. It would probably be more correct to say that the jets might play continuously, as in consequence of the great demand for the bottled water the stream is made to flow into the bottling apparatus, and the jet only turned on when visitors arrive.

But probably the most charming and attractive object around Saratoga is the lake, which lies in a basin, about four miles to the east of the town. It is about nine miles long and a mile and a-half broad, and is reached by terraced walks and drives. Two steamers ply on its surface, and afford to the tourist or visitor an opportunity of enjoying a combination of the beauties of Loch Katrine and Windermere. High up on the banks, but level with the road, there is a fine hotel, from the piazza of which a fine view of the lake is obtained, and here during the season may at any time be seen hundreds of visitors absorbed in contemplating its beauties and eating *Saratoga potatoes.'* It is strange how some places obtain a reputation for particular articles. I have said in a former communication that the American tourist does not drink, at least in public. Under such circumstances, in the old country, few guests would be found without the accompaniment of bitter beer or the more potent whisky; but here there is nothing—at least visible—stronger than iced water, but, instead, everyone seems under the impression that the beauties of the scene can only be fully enjoyed while munching the dainty already mentioned, and for the preparation of which this hotel is famous. "Saratoga potato" is prepared by cutting the root into extremely thin slices or ribbons by a suitable machine, and then frying them in lard or other fatty matter. They are supplied to visitors in beautifully-white paper, twisted into the form of a cone or cornucopia; and so delicately is the process carried on, and so thoroughly is the surplus sebaceous matter removed, that the paper cone is not even soiled, and the ribbons may be picked out one by one with the most daintily-gloved hand without the glove being stained.

Of course where so many idle people, or people bent only on the pursuit of pleasure are found, photography is likely to come in for a fair share of patronage. Such photography, however, as is to be found at the average watering-places here as well as in Britain would not be tolerated. Visitors to Saratoga, as a rule, have long purses, and equally as a rule the purse is not without its influence. Although there may be, and undoubtedly is, an absence of a high appreciation of true art, the artist, if he wish to secure a large *clientèle*, must surround himself as much as possible with what is grand and imposing. Of the several establishments I visited the same may be said of each; that is, there is plenty of furniture of the richest description, fine specimens in attractive show-cases outside, and very indifferent work within. The idea conveyed by an examination of the whole seemed to be that the people went to be photographed more as a joke than with any idea of getting pictures for permanent use; or that sitting was more a result of the caprice of the hour, and the portraits intended to be simply amusing reminiscences of temporary acquaintanceships, to be forgotten within a brief period after returning to the sober realities of life. Under such circumstances one could hardly expect to find much striving after high-class work, and if he had he would have been wofully disappointed.

Albany, the picturesque capital of the State of New York, was our next halting-place. It is beautifully situated on the Hudson about a hundred and fifty miles from the city which gives the state its name, and, being built on the face of a hill or rising ground, the streets seem to rise in terraces one above another, with the recently rebuilt capitol as its crown. It is a thriving place as regards business, with a high opinion of itself and of everything belonging to it, and consequently also of its photographers—so far as the latter are concerned not without good reason. It must be true that fashion largely influences photography, otherwise how could we account for the fact that in some cities there is hardly a specimen of landscape or architectural photography to be seen, while in others such specimens are more numerous than portraits in the show-cases of the professional photographer? In Albany the latter is especially the case, and most of the specimens were of a high order of merit. Mr. Notman, of Montreal, who has a branch establishment here, showed a view of the new capitol as perfect in every respect as it is possible for an architectural photograph to be, and a group of the senators hardly less perfect. In the reception-room of Mr. Horton there were also some splendid portraits, from *carte* size up to at least 18 × 24, which in delicate detail and modelling without retouching, were equal to anything I had previously seen. No doubt there were one or two places where the ordinary inferior pictures were turned out, but, on the whole, the observations made regarding photography in Detroit are quite as applicable to that in Albany, and the result, as might be expected, is similar; each artist has as much to do as he can manage, while the prices are far above the average in towns of similar size.

JOHN NICOL, Ph.D.

THE TRUE ACTION OF A HORSE IN TROTTING DETERMINED BY PHOTOGRAPHY.

ONE of the most interesting and successful experiments ever made in connection with electro-photography was witnessed yesterday, at the race track at ex-Governor Stanford's ranch, at Palo Alto. For years past it has been a matter of grave discussion, not only among turfmen, but also with those who take an interest in trotting, as to the true action of a horse when in full stride, both in trotting and running, and the question was never satisfactorily settled until Mr. Muybridge, under the auspices of ex-Governor Stanford, instituted a series of costly experiments that have culminated in a grand success, and will open a new era in the photographic art.

The apparatus is very simple, but yet shows an immense deal of study, ingenuity, and foresight. On one side of the track was a rough shed, in which were the lenses and cameras, twelve in number, and on the opposite side was a huge screen of white canvas, stretched over a scantling fence, some thirty feet long and eight feet high, with a backward declination of some sixty degrees. On the upward edge of this canvas were shown the figures one to twenty consecutively, severed by vertical cords at twenty-one inches distant, and at the bottom of this canvas was a board showing horizontal lines that represented four, eight, and twelve inches above the level of the track. About two feet from the same canvas, but on the track, was a slight wooden ledge, and between the two, at every number between four and sixteen, was stretched a galvanic wire, at about an inch from the ground, each one connecting with its numbered lens on the opposite side, the wires being taken underneath the track. The investigation thus far was very simple, as it was apparent that the inner wheel would pass over the projecting wires, and by a simple arrangement on the other side would close the circuit. But, then, arose the question as to how this could be utilised to take a picture in the estimated incredible fraction of time of the two-thousandth part of a second—in which period the lenses had to be exposed and closed. This was effected by a very ingenious contrivance in the shutters of the camera, to the upper and lower parts of which were adjusted very powerful springs, and when the electric current was perfected they were released, and in crossing they exposed a space of about two inches, and in this space of time, that represented but a flash of lightning, the passing figure was fixed on the highly-sensitised glass even to the minutest details.

The ground over which the experiment was to be made being covered with slack lime, so as to catch even each footstep of the stride, all was duly prepared, and Abe Edgerton, with Charles Marvin holding the reins, appeared on the track to show by twelve almost instantaneous photographs the true story of the stride of the horse. Down the track came the gallant grey at about a 2:20 gait, and, never swerving an inch, despite the glare of the lime that glistened in the sun like a sheet of placid water, he dashed across the lines, the inner wheel touching each of the twelve wires and causing a regular but scarcely distinguishable clatter, and within those twelve cameras each part of his stride was fixed; that would conclusively show that the preconceived ideas of artists and horsemen were all wrong when based on the supposition that in that same stride two feet were never on the ground together. The negatives, as afterwards shown, are far clearer than can possibly be reproduced on paper.

In the first picture the horse's head is under No. 8 on the board, the second under No. 9, the third under No. 10, and so on, each partition of twenty-one inches showing the horse getting forward until the fifth, when he almost exactly reproduces with a change of legs the previous movements, completing the stride in about 18 feet $4\frac{1}{2}$ inches. The first and second positions are pretty natural, one hind foot being on the ground; in the third he has one fore foot planted square in front, while the other is doubled up like the crossing of a letter T; in the fourth position the same leg assumes the form of the loop of the letter P, while the other fore foot and a hind foot are planted straight and square on the ground, producing a most whimsical if not absurd effect, and at the fifth position the half stride is made, and the remainder is but a repetition. Each of the twelve pictures is about half-an-inch in height and three-quarters in length, and so minutely is each delicate line shown that not only are the spokes of the wheel distinct in form and shape, but even the whip in the driver's hand takes shape, and the horse's mane changes also at each part of the tail.

On examining carefully the footprints it is shown that the fore legs are used mainly as props, the imprint being clearly defined, while those of the hind legs, both at the front and rear of the foot, are so vague and enlarged as to show clearly where the propulsive power mostly lay.

It is impossible to state the astonishment that this most successful experiment caused in the minds of the spectators; but there was yet another surprise for them in the shape of photographing a horse at full gallop. To compass this there was necessarily a change in the proceedings, thread being stretched across the track connecting with each lens, through an ingenious contrivance that prevented any strain on the instruments. Then the noted mare, Sallie Gardiner, was sent at full gallop against the frail obstructions; but dazed by the glare of the white lines she hesitated a moment, then dashed on and made a bound again at the finish, thus presenting far from a perfect stride. But still she went fast, and her stride, eighteen and a-half inches, was but little beneath her normal action. The negatives, however, presented the most incongruous attitudes that ever could be conceived by a disjointed imagination, and they are as unlike that fine flowing stride we usually see depicted in our racehorses as are the movements of a dilapidated marionnette.

And here again are the preconceived ideas at fault that the horse bounded, landing his feet in regular succession. But it will be well to reserve an opinion on this subject until further experiments are made. In any case the result was most successful, and it is difficult to state to whom were addressed the heartiest congratulations—to ex-Governor Stanford for initiating the possibility of achieving this unexampled feat, and for the liberality with which he furnished the means for such costly experiments, or to Mr. Muybridge for the patience, skill, and perseverance with which he brought the affair to so happy a consummation.—*San Francisco Chronicle, June* 16.

Our Editorial Table.

PORTRAITS. By G. WATMOUGH WEBSTER, F.C.S.

ON opening a packet of portraits received for review from Mr. G. W. Webster, of Chester, we immediately recognised in these pictures the highest artistic qualities. Mr. Webster, as most photographers are aware, is a gentleman who has often contributed to the literature of our art-science, his literary and scientific essays never descending to the level of commonplace, but invariably being of an advanced and suggestive character. Mr. Webster not only "knows what is right" in the science and practice of photography, but, judging from these examples of his work, he has carried to a very high practical development his knowledge of art principles. It is seldom we find in a photographer a combination of scientific knowledge, artistic feeling, and practical, manipulative ability; but in this artist we have these qualities happily blended.

There are certain specimens from which we infer that Mr. Webster's method of working secures a degree of rapidity much greater than is usually met with. In proof of this we find among many charming portraits of children several which bear evidence of having been taken in a fractional part of a second. Others, in which dogs are introduced, testify to the same fact. Among the latter, one of the finest is a portrait of the Marchioness of Ormonde and three of her canine favourites, two of which are reposing respectively on the floor at her ladyship's feet and upon the chair, over which she leans snapping her fingers at the third, who is "reared" on his hind legs in response to the call of his noble mistress. It forms a very pretty picture, being replete with life and action. In a second picture of the same group the arrangements are different. Here we have a large retriever, his paws upon the back of the chair, "assisting" Lady Ormonde in inspecting a canine pet who has posed himself upon the seat of the chair.

Equally successful in pose and expression are portraits of Viscount Southwell, Lord Gerald Grosvenor, and the youthful Lady Margaret Grosvenor. Several of the portraits of children remind us of the happiest efforts of Faulkner and Boisonnas—names associated with graceful posing and that wonderful expression which in a photograph is so mainly dependent upon extreme rapidity of exposure.

The disposition of light and shadow in these portraits—which include several charming full-length cabinets—indicates a well-arranged studio; for, while the lights are pure and bright, the shadows are neither heavy or smudgy.

We hope to find Mr. Webster contributing some of these pictorial gems to the next London Photographic Exhibition, for we are certain that his metropolitan brethren will not be slow in recognising and appreciating their admirable qualities.

We are pleased to be able to add that Mr. Webster has, at our request, contributed to our present number an interesting article on the photographing of babies, to which we invite attention.

CLOUD NEGATIVES. By W. PERRY, Hythe, Kent.

SINCE we last acknowledged the receipt of a sample of cloud negatives by Mr. Perry, this artist has introduced further improvements, lying in the direction of getting rid of the texture or grain of the paper in a manner more thorough than heretofore, and also in imparting to the paper a greater degree of transparency.

We are not aware of the means employed by Mr. Perry to secure this increased transparency; but, by comparing those by his "new method" with some waxed-paper ones, we find that a decided step in advance has been made. With regard to the great utility of cloud negatives we need scarcely add to what we have already frequently said. The pure white skies, once the pride of the landscape photographer, cannot now be tolerated—thanks to the cultivation of a better taste among both photographers and the public; but, on the other hand, the difficulties of obtaining negatives of a high class in which the sky and clouds shall be rendered as perfectly as the landscape are well-nigh insuperable. In nine-tenths of the landscape negatives taken the sky presents an unbroken, monotonous tint, which in the print is both unnatural and inartistic. It is here that the cloud negative, by being judiciously introduced, imparts value to the photograph.

Meetings of Societies.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

THE half-yearly meeting of this Association was held on Wednesday evening, the 3rd instant, at 160a, Aldersgate-street.

The minutes of the previous meeting having been read and confirmed, the half-yearly statement was submitted to the Board by the Secretary and compared with the corresponding half-year of 1877. By this it was seen that the Association was making steady progress.

Miss M. C. Coates and Mr. R. E. Wilkinson were elected ordinary members of the Association.

Other minor affairs having baen dealt with, the meeting was then adjourned.

THE PHOTOGRAPHIC SECTION OF THE AMERICAN INSTITUTE.

AT the May meeting of this Society Mr. H. J. Newton presided. He said: I stated at the last meeting that I would show some emulsion portrait work at this meeting. I intended to have gone into some portrait galleries where I could have an opportunity of seeing the work done under a different light from my own; but I only had one—that of Mr. S. A. Thomas, forty-first street and sixth avenue—and I here exhibit a print from a negative there made by an exposure of two seconds. You will see that ample time was given. I also exhibit negatives made at my own gallery, with exposures of six and eight seconds—not more than one-fourth the time required by the bath process—and prints from the same.

The negatives and prints were very fine, and elicited much praise from those present.

The PRESIDENT, continuing, said: I have here a 4-4 negative, in the making of which I used Mr. Willis's oxalate of potash and ferrous oxalate developer; also prints from the negative. I experimented a very little with it through the last summer and fall. I also experimented with the oxalate of ammonia and soda, and got pictures with all of them, but much the best with the oxalate of potash. Until recently I had not given much attention to it, being engaged in other experiments; but within the last few months I have simplified it very much. That is what I try to do with every process, so as to make it generally practicable. Now with my emulsion I have aimed, after producing satisfactory results, to simplify it down to a point which makes it practicable and accessible to anybody in the business. This plate (exhibiting) was developed with the neutral oxalate of potash and ferrous oxalate, acidified with citric acid just sufficient to turn litmus paper red. The neutral oxalate was nearly a saturated solution. To that I added fifteen grains to the ounce of pulverised protosulphate of iron. My object was to get rid of that part of the process which required the manufacture of the ferrous oxalate as a separate salt. In these experiments I varied the quantity of iron from five to thirty-five grains to the ounce; but you gain nothing beyond saturation, as the ferrous oxalate precipitates after the solution is saturated. I found that fifteen grains would readily dissolve in the oxalate solution of the strength given. Such was the developer with which this negative was made, and it speaks for itself. It was slightly strengthened with the ordinary acid pyro. and silver, and a more perfect negative is rarely seen.

Mr. Duchochois: Do you find any difference in the time of exposure between the soda and ferrous oxalate developer?

Mr. Newton: I found that with the solution prepared in that way no longer exposure was necessary than with my carbonate of soda developer.

Mr. Chapman: Did you find any advantage in using that instead of the soda?

Mr. Newton: I was trying it, as I try any new thing, to see what there was in it. After I had satisfied my mind that it was a good developer or might be made so, or that it promised to be something of value to photographers, then I went to work to see how far it could be simplified and made more efficient. It is better than I have before made with any modification of this developer. As to the advantages, if any: in the first place this developer can be used over and over again with the same effect until it is considerably weakened; add a little more iron to it and its vigour is restored. A plate cannot be fogged with it if the solution is acid. That is my experience. It promises fair to be the developer of the future for this class of work. After making it in various ways, I find that that stated at a prior meeting was the most simple and attended with much the least trouble, which was to make a saturated solution of carbonate of potash in water (take what is called salts of tartar), and to that add oxalic acid in crystals. Of course, as soon as the oxalic acid comes into contact with the potash solution carbonic acid is evolved so rapidly that it keeps the crystals afloat on the surface; they are soon dissipated—all dissolved. When it becomes saturated some of the oxalate of potash is precipitated, and the natant liquor is a saturated solution which may be diluted as required. This developer was acidified with citric acid. I found by further experiment, however, that this extra trouble of acidifying at this point of the process could be avoided by making the oxalate of potash, when compounded, slightly acid with oxalic acid.

Dr. Nicol, of Edinburgh, was introduced to the Section by the President, with appropriate remarks in reference to his connection with the photographic press.

Mr. Gardner: I have had some little curiosity to know whether Mr. Newton's process was all that it purported to be. I visited his gallery for that purpose, and saw some of his pictures that we have been looking at here this evening. Several negatives were made while I was there—one of myself. As he has stated, his skylight is very small, and, at the same time, the sun was coming in on one portion of it; consequently I had to sit in the back part of the room, where to my eye it looked as though it might require thirty or forty seconds, at least, by any wet process any way, to get pictures. Mr. Newton made a picture in about six seconds. I also examined a number of negatives and saw they were remarkably smooth—that is not apparent in bath plates; and, I must say, I was somewhat converted to the emulsion process. So this evening I wrote this paper with the intention and purpose that, if I am mistaken in my judgment, if I overrate the thing or make any mistakes, it may be stated here and I may be corrected. I say that the specimens of emulsion pictures here exhibited are, in my judgment, conclusive proof that this method of working will produce as good results as any of the processes now in use where negatives are made by means of the silver bath. And it has a number of advantages over any of the bath processes. In the first place it is less expensive, for it does away with the use of about four-fifths of the nitrate of silver commonly used in photographic galleries. In the next place, it is not so liable to fluctuations—for every plate used in a negative bath reduces its strength, modifies its working condition—and the constant tendency is to uniform results. Besides, the bath, to keep it in anything like working order, has to be frequently clarified and strengthened; and to do this successfully no small amount of time and expert practice is required. Another advantage is that it does away with the retouching of negatives, and this is one of the most expensive items of negative making. Another advantage is its sensitiveness to light. With the emulsion process more negatives can be made in a day than can possibly be made by the old methods of working, for the time of exposure is reduced from one-third to one-half of the time necessary for bath plates. For out-door work it requires less luggage, and it is more certain in its results, as it admits of a greater latitude in the exposures, and is more under control in the development of the negative. Now, with all these advantages, viz., its less expensiveness, its greater certainty and uniformity of results, its saving of time and labour, its shortness of exposure, and the small amount of luggage required in practising outdoor photography — with all these advantages, I say, you would naturally think that every photographer would at once sell his bath to the silver refiner, and abandon for ever his old method of working. But you make a great mistake if you think so; and for the reasons, perhaps, that you do not take into account the power of habit, the influence of prejudice, the disposition to scepticism, and the dread and labour of learning anything new that requires an outlay of both time and money. The great advantage, therefore, to be derived from the emulsion process will, no doubt, be reaped by those who are yet to learn photography, and who can learn the use of emulsions quite as easily as that of the silver bath. The emulsion process has no doubt a long lease to run, and in the end will come out the victor; and if spirits be permitted to see the progress of mortals, our President will, no doubt, behold with delight in the vista of the future the fruits of his persevering and eminently philanthropic labours.

Mr. Chapman: You might say that it does away in a great measure with the retouching, but not entirely.

Dr. Nicol addressed some remarks to the Section, in the course of which he said: There is no doubt that the most of us workers have derived a great deal of benefit from Mr. Newton's emulsion. I have tried almost every modification, and my opinion is, at the present moment, that it is the best emulsion—you can get the most reliable plates. I speak of dry plates only, because I have never exposed an emulsion plate wet—mine is always dry work. The best emulsion is one containing just the merest trace of a free bromide—not with free silver, but with bromide. I have had no difficulty in getting density on very sensitive plates. I can usually guarantee a dozen good negatives from a dozen plates.

Mr. Newton: My experiments led me to adopt a chloride instead of a bromide for removing the free silver from emulsions. I use chloride instead of bromide on account of the retarding influence of bromide in excess. There is no retarding effect in chloride.

The proceedings shortly afterwards terminated.

Correspondence.

"TRANSATLANTIC NOTES."

To the Editors.

Gentlemen,—On reading the *Transatlantic Notes*, by Dr. Nicol, in your issue of the 28th ult., I was surprised to read the following:—"I feel bound to admit that neither in beauty, order, regularity, or apparently in business enterprise, are the towns in Canada equal to those of the States."

Now I think it rather unfair of Dr. Nicol to make such a sweeping assertion in contrasting the little town of Hamilton, which is scarcely sixty years old, and whose population is only 27,000, with the monster cities of the Union. If he had gone as far as Toronto or Montreal, I think he would have altered his opinion, and would have found something worthy of his approbation. The latter city is especially worth a visit, and is generally admitted to be one of the finest cities in the western continent. The site of Montreal—as you approach by steam boat, after passing under the Victoria Bridge with Mount Royal for a background, with its beautiful villas, interspersed here and there with tall spires and cupola towers, whose metal coverings glitter in the sun—is majestic, and for beauty almost unrivalled.

Here may be seen abundant evidences of business enterprise and energy—well-built streets, squares, good shops, and, in fact, all that you might expect to find in a place where a very large proportion of the inhabitants are Scotch. Dr. Nicol would have found himself at home there. Mr. Notman, the well-known photographer, would have given him a hearty welcome, and shown him work, perhaps, second to none in the States. I believe he employs upwards of fifty artists and assistants; so we may easily imagine the amount of business done in this one establishment. If my pen were as facile as Dr. Nicol's I might give you a glowing description of what I saw there, but I will not attempt it. Perhaps on his next visit to America he may be able to go as far as Montreal, when, I trust, he will qualify the remarks which have led me to trouble you with this communication.

Dr. Nicol also states:—"It may be that there is as much business done, and that the business men among the Canadians are as wealthy as their American brethren; but there is certainly no visible evidence of it in their homes, either externally or internally, or in the 'dash' and 'go' everywhere seen in the States." That is just the difference, and I admit the "dash" and "go," swagger, bounce, and ostentation which is so conspicuous in the Yankee "boss" is absent in the Canadian; the latter are more thoroughly English in their style. I was frequently asked in the States if I did not think the "old country" was nearly "played out;" perhaps they thought so.

Having visited some of the largest cities in the United States and Canada, I trust I may be excused for giving my views in opposition to those of Dr. Nicol.—I am, yours, &c., T. Protheroe.

Bristol, July 3, 1878.

The Forthcoming Eclipse of the Sun.—The White Star steamer "Germanic" sailed from Liverpool on Thursday, the 4th inst., for New York. Amongst her passengers were Mr. A. Cowper Ranyard, Fellow and Hon. Secretary of the Royal Astronomical Society; Mr. F. C. Penrose, F.R.A.S.; Mr. Giles Loder, Mr. Arthur Schuster, and Mr. T. E. Thorpe. All these gentlemen are *en route* for Denver, Colorado, to witness and take observations of the total eclipse of the sun, which takes place next month. The eclipse is invisible in England, but is visible in its totality at Denver, which is in the centre of the line of observation. Mr. Ranyard, the senior member of the astronomical party, has the special object in view of photographing the corona, and for that purpose takes out an instrument which is exciting much interest amongst astronomers on account of its unusual size and power, viz., a thirteen-inch refractor.

EXCHANGE COLUMN.

We will exchange a Ross's seven-inch focus portrait lens, in perfect condition, for a rectilinear (rapid) of similar value.—Address, Ross and Paton, Hamilton, N.B.

Wanted, an alpinestock camera-stand and quarter-plate or 5 × 4 camera, with two single and double slides, in exchange for any of the following:—Studio camera-stand, box tent for 10 × 8 plates, Chadwick's oxygen retort, or whole-plate camera, with one double slide only.—Address, E. J. Chesterman, 12, Chipping-house-road, Sharron, Sheffield.

ANSWERS TO CORRESPONDENTS.

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

To Correspondents.—Several letters which have been received during a brief absence from home, and to which *private* replies have been requested or are necessary, are receiving due attention. All such communications will be speedily answered.

Electro (Paisley).—We have received the shutter, and will give it a trial.

Geo. Smith, Jun.—A solution of caustic potash will precipitate the oxide of silver from the nitrate.

J. Barclay.—The fact of plates having been developed by tannin, coffee, and tea has long been known.

E. W. P.—Carbon pictures may be intensified by a variety of agents, such as iron, manganese, lead, and silver.

W. R. P.—The degree of heat at present is not so great as to interfere seriously with the preparation of gelatino-bromide plates.

Vox Humana.—A tolerably safe estimate of the quantity of chloride of gold required will be one grain for each sheet of paper.

B. B. B.—No photographic directory has hitherto been published; and it is not at all probable that such a work will ever be issued.

J. P.—We have an impression that the patent is still in force; if this impression be correct it will be more than a year ere the patent expires.

G. B. L.—We are much pleased to learn that you followed our advice, and that by doing so everything was arranged in such a satisfactory manner.

Old Sub.—Try the following:—Iodide of potassium, six grains; bromide of potassium and chloride of soda, of each five grains; water, two ounces.

Alfred.—Chlorise the image by applying to the surface of the plate a solution of bichromate of potash to which a few drops of hydrochloric acid have been added.

F. J. O'B.—The signatures will not be required. Supply such other particulars as you are able to do, numbering each figure for convenience of reference.

Geo. Spence.—If you call at our Publishing Office you will have an opportunity of looking through the file of the Journal and selecting such numbers as are required.

Largo.—Obtain a larger condenser. That which you now make use of is too small. It ought to be ten or twelve inches in diameter at least—if twenty inches so much the better.

E. Grant.—The matter is, we think, one for a solicitor. If you have *not* paid, the affair is exceedingly simple; you have merely to state the grounds upon which you refuse to do so.

M. D. H.—Not so; read the article again, and you will find that precisely the opposite to what you quote is stated. You have mistaken convexity for concavity—that is all; but it is much.

G. M.—The signature is merely a *nom de plume*, as surmised by you. It would be contrary to journalistic etiquette to divulge the name of the writer so long as he does not wish this to be done.

Geo. Richardson.—If you mix a little albumen with the gelatine the desired property will be secured. The albumen must be beaten up and poured slowly into the liquefied gelatine, which must be well stirred all the time.

P. T. A.—We, too, have felt the want of such a piece of apparatus as that at which you hint; but we must continue to wait patiently until some mechanician or maker of apparatus will devote his inventive faculties to the subject.

V. H. Z.—On referring to our volume for 1875 you will find a brief series of articles on polarised light, and in one a full account of the Nicol prism is given, illustrated by a diagram in which its influence upon a ray of light is shown.

Harding.—Without examining the lens it is scarcely possible to pronounce who was the maker, but we think it probable that it was manufactured by the late J. T. Goddard—that is, if your description be correct. The lenses of this optician enjoyed a high reputation.

T. J. P.—The markings on the Fothergill plates are caused by inequalities of temperature during drying. This is so certainly the case that we will undertake to produce a drying-mark by merely lifting up the cover of the drying-box for a few seconds and then replacing it.

H. F. Kay.—If the transfer has been allowed to become quite dry previous to being removed the surface will be glossy, receiving the pigment with facility and without any preparation. Numerous articles have been published on the transfer process, but no work has been exclusively devoted to it.

W. D. H.—A dry plate will not be required for your purpose, seeing that a wet collodion plate will retain its good properties unimpaired for all the time—an hour—you wish to keep it. Let the plate be sensitised for nearly the full time, then remove it and immerse in a silver bath of the strength of twelve grains to the ounce. Drain thoroughly and place behind it in the dark slide a sheet of moist blotting-paper. The slide should then be wrapped up in india-rubber cloth.

L. S. D.—1. The name of the photographer and also the title of the picture will this year be permitted to be exhibited upon the frames of the pictures at the forthcoming photographic exhibition.—2. Yes; the charge will be a shilling per square foot for wall space. This, it will be found upon reflection, is only fair and reasonable.

Cygnus.—In sliding the lens towards the top of the camera let its parallelism to the base be carefully preserved. We are assuming that the back of the camera cannot swing. In the case of a swing-back the lens may, with advantage, be moved so as to have its axis at a right angle to the plane of the ground glass, but this will not always prove advantageous.

E. E. B.—The collodion employed has not been one quite suited for the purpose. Let it be somewhat old, and such as will yield a soft, thin picture full of detail. The tone of the three-quarter figure is excellent; but, owing to the obliteration of detail in the shadows, it presents a harsh appearance. Try the effect of thinning the collodion by the addition of nearly its own volume of ether and alcohol.

P. T. Richardson.—We advise you not to allow anything to be done with the lens. A small chip at the margin, although it might interfere with the saleableness of the lens, will not interfere with its working, except in so far as it reflects light upon the plate. But this it will not do if the fractured patch be painted over with opaque black varnish, which may be applied by means of a camel's-hair brush.

A. C. (Morpeth.)—1. A collodion positive upon glass cannot be fitted into a locket by the method you propose, as the edges would be sure to present a broken and rugged appearance. By employing a pair of sharp cutting-pliers, guided by such skill as can only be acquired by practice, a smooth and unbroken-looking edge can be obtained. So smooth will it be as to render quite unnecessary the employment of a mat.—2. Any jewellery "factor" in Birmingham will be able to obtain, and supply you with, an assortment of oval mats for brooches and lockets.

Received.—John J. Atkinson; J. W. Gough (Durbhanga); W. Washam.

The Jurors at the French Exhibition.—If the Paris correspondent of the *Leeds Mercury* be correctly informed, the jury work at the French exhibition is understood to promise much greater thoroughness of performance than at some previous exhibitions. Members are informed, he observes, they must be prepared for a month's hard work. This, in the case of unpaid gentlemen whose services are often required for their own business, is rather hard. Great courtesy is shown by the French in nominating foreigners, and especially Englishman, to posts of distinction. Thus Mr. John Berger Spence, the well-known chemical manufacturer, was offered the vice-presidency of that section, but he felt himself obliged to decline it, owing to his engagements at home preventing his being always on the spot to replace the president if necessary. The jurors in some cases appear to hold a sort of clinical lecture, each one expressing his views as to the object of examination, and giving rise to a short discussion. This was done in the photographic class, where the members present spent a long time over a collection of specimens of sun pictures, from the earliest attempts of Daguerre and his predecessors down to the most finished modern results. If this workmanlike procedure is kept up, we shall not see any of the scandals of Vienna repeated, where three gold medals were awarded to names in the catalogue whose goods never figured in the exhibition, and where a lawn mower obtained a prize for "sweetness of tone" through its proximity to a stand of organs!—This will be suggestive of the labours of a jury at the North London Exhibition several years ago—a body which awarded medals for the excellence of lenses the show cases containing which had never been unlocked by these *examiners!*

LONDON GAZETTE, *Friday, July* 5, 1878.

Partnership Dissolved.

Mann and Fursman, Bury-street, Bloomsbury, mount manufacturers.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For the Week ending July 10, 1878.

These Observations are Taken at 8.30 a.m.

July.	Bar.	Max. Tem.		Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
		Sun.	Shade.					
4	30·13	112	75	50	54	60	W	Fine
5	30·10	102	74	55	59	60	W	Cloudy
6	29·99	110	80	58	61	66	NW	Cloudy
8	30·04	97	73	58	58	64	E	Fine
9	30·10	114	77	55	60	65	W	Cloudy
10	29·90	105	70	56	58	63	NW	Cloudy

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 950. Vol. XXV.—JULY 19, 1878.

WINDOW PORTRAITURE.

It is by no means an uncommon statement, and one which has almost come to be accepted as an axiom, that an amateur cannot hope to aspire to the same degree of excellence in portraiture as the professional; and the comparatively limited extent to which that branch of photography is worked by the former class, and the general quality of the results produced, tend to prove at least the prevalence of the idea if not its truth. In landscape work amateur and professional meet upon equal ground in all respects but one, *i.e.*, the relative amount of time which each is able to devote to the practice of the art—a condition which must plainly have a more or less important bearing upon the degree of skill acquired by the operator and upon the quality of his results. But in portraiture the amateur is placed at a still greater disadvantage, inasmuch as but few of them can afford or find it worth their while to maintain a properly-arranged studio for the special purpose. Even if the photographer be the fortunate possessor of a greenhouse or conservatory he is little better placed in this respect, as the arrangements necessary for the practice of portraiture go far to unfit it for its legitimate use.

We have, however, on several occasions pointed out that a glass-room, such as is employed by the professional portraitist, is by no means an absolute necessity in the limited practice of an amateur; and, though the system of lighting adopted in ordinary apartments would prove wholly inadequate to the requirements of the former, the latter—if he be not too ambitious—may under such conditions produce work of a certain class possessing the highest degree of artistic as well as technical excellence. We are aware of many attempts to practice what we have termed "window portraiture," some of which have been entirely successful—others, and perhaps the majority, have proved partial or total failures; and, as there appears to be a growing fancy for portraiture amongst amateurs, it may not be out of place on our part to add to what has been already written upon the subject, and to point out the probable causes of many of the failures.

In the first place, then, perhaps the chief cause of failure arises from the attempt to do too much. It is obviously useless to expect an ordinary apartment, however much be-windowed it may be, to enter into competition upon equal terms with a properly-constructed studio, either as regards the amount of light available or the effects of lighting obtainable. It is a tolerably self-evident fact that the amount of light admitted will depend upon the size of the window; but an equally important element is frequently overlooked—the shape and position of the window. We need not enter into a dissertation on the construction of a studio or of the best form of roof or window; but merely allude to the principle it involves, in order to show in what manner the form of the window, independent of its size, may modify the quantity of available light admitted.

The source of illumination is, of course, the reflection from the sky (direct sunlight, for obvious reasons, we omit from the calculation). With a given size of skylight, in order to admit the greatest amount of light, it is necessary that it be placed at such an angle that an imaginary straight line, drawn from the sitter to the most highly-illuminated portion of the sky, shall fall perpendicularly upon the centre of its plane. This secures the largest possible angle of illumination. But to construct a roof strictly on this principle would be impossible, since its "pitch" would require to vary continually with the seasons and with the time of day; hence it is necessary to select a fixed angle which shall be most generally useful, and this is found to be from 35° to 45°.

A simple diagram will show that in proportion to the vertical measurement of the opening an ordinary window transmits considerably less direct light from the sky than a pitched roof, but that it also admits a large quantity of diffused light reflected from local terrestrial objects, which the latter does not. It will also be seen that the higher the window is placed from the floor the greater will be the distance at which the sitter may be placed, in order to secure the greatest amount of direct light, and that in any case a point is reached at which the illumination depends entirely upon the feeble reflection from local objects. It is needless to say that the actinic value of the two descriptions of light is very great; but the eye being accustomed to the ordinary illumination of an interior fails to take cognisance of this difference as the camera does, hence the cause of many failures. We have two conflicting interests to study: the optical arrangements require a certain distance between the camera and the sitter, to secure which, in combination with an even illumination, the latter must be placed at a considerable distance from the window; on the other hand, in order that the exposure may be brought within reasonable limits it is absolutely necessary that the sitter be placed in close proximity to the window, which entails the removal of the camera to such a position that the greater portion of the figure is in deep shadow.

To reconcile these conflicting conditions, then, is the object we must have in view, and the first thing to be observed is that we do not attempt more than the circumstances permit us to perform. Thus the proper illumination of a full length figure is obviously more difficult of attainment with our limited supply of light than a bust or vignette, and indeed, save under very exceptional conditions, is almost an impossibility. We therefore advise, as the first step towards success, that this style of portraiture be confined to the production of busts or, at the most, half lengths. This not only reduces the area to be illuminated, but permits the sitter to be placed within two or three feet of the window, and, at the same time, enables us to bring a reflector into operation on the shaded side of the figure without its interfering with the picture, which, in the case of a full length, is extremely difficult, if not impossible.

In order to obtain a well-lighted face it will be necessary to devote a little study to the peculiarities of this style of illumination, and to bear well in mind the fact that the shadows will appear much darker in the photograph than to the eye; indeed, the chief difficulty rests in trusting too much to the appearance of the sitter without considering the low actinic power of the light reflected from the walls of the apartment. The first mistake which will be made is in placing the sitter *facing* the light; this not only tries the eyes and produces an unnatural and constrained expression, but it necessitates placing the camera in such a position that the greater portion of the face is in shadow, or the lines and hollows of the features are intensified to an unpleasant extent.

It is, of course, impossible to lay down any fixed rule for posing the sitter without knowing the conditions under which the operation is to be performed, but in a general way the following remarks will be found useful:—Let the relative positions of the camera and sitter be such that a line drawn from one to the other will run parallel with the window. If the latter be of such proportions that the sitter can be placed four or five feet distant from it it will be possible to place the camera much nearer the wall and thus get on the lighted side of the figure, which should be almost but not quite clear of the window on the side most distant from the camera. By this means we secure more of a front light, and the shadows on the far side of the face are softened down. The eyes of the sitter should be directed *into* the room so as to present the lighted side of the face to the camera; it is not well to carry this too far, however, or a shadow will be cast by the line of the cheek, especially if prominent. Finally, a reflector of some sort will be absolutely necessary to the production of a harmonius result; for this purpose we have used a variety of materials, but nothing answers better, or is easier of management, than a sheet hung upon a light framework, and placed as close to the figure as circumstances will permit.

Of course, as the operator becomes familiar with the light numerous effects will suggest themselves; indeed, there is scarcely any sort of lighting which cannot be produced by a judicious use of screens and reflectors. In the matter of exposure very much will, of course, depend upon individual circumstances; but, while not nearly so rapid as in a properly-constructed studio, the time will not be found too prolonged for sitters of ordinary steadiness. We have seen a fully-exposed and well-modelled picture the result of ten seconds' exposure upon a rapid dry collodion plate; and with films of only moderate sensitiveness, used dry, twenty-five to thirty seconds' exposure proved ample. With gelatine plates or wet emulsion the time would be considerably reduced.

So far our remarks have referred entirely to indoor photography, but it is possible to work in a slightly modified manner. We have seen some very charming results produced by placing the sitter in a room on the ground floor and the camera in the garden, the exposure being made through the open window; and where circumstances permit this is, perhaps, the easiest plan of operation. We have said nothing of the employment of a mirror interposed between the sitter and the lens; but in some cases—as, for instance, when space is limited or where reversed negatives are required — this method will recommend itself, and presents no special peculiarity in manipulation.

THE CONSTRUCTION OF WATER TANKS.

The making and maintenance in proper condition of the various tanks, troughs, and sinks required in establishments of even the smallest pretensions is always a matter of considerable importance; and, now that carbon printing is becoming so much more general, the occasions are many in which professional photographers find that an entirely new series of troughs has to be constructed. We have, therefore, thought it would be useful to some of our readers to lay before them for their consideration a few details of various plans adopted, together with some *data* to work from with regard to their comparative cost and the wear and tear they will sustain.

For general dark-room work nothing, perhaps, is more common than wooden trays or troughs kept well painted. They are pretty efficient if properly made in the first instance, the joints being secured, if possible, by white lead, and a good number of coats of paint laid on afterwards. They are, however, liable to separate at the joints, or otherwise to leak rather badly; but to some extent this can be remedied by using the best and driest timber of which to construct the troughs, and instead of painting them to coat them with some kind of bituminous varnish, such as the best "Brunswick black" (not "black Japan"), which forms a very tenacious and useful surface, there being some troughs so made which are, to our own knowledge, seven or eight years' old, and still apparently as good as when new.

Gutta-percha has been used for this purpose, but it is apt to get hard and brittle in time, and is besides not by any means an inexpensive material. A former well-known contributor to these pages described a sink of his own contrivance which answered very satisfactorily. It was primarily a wooden trough of the usual kind, made water-tight by stretching over it a sheet of the thin india-rubber that can be purchased from almost any shop where india-rubber goods are sold.

But the most efficient, substantial, and enduring tanks are those made of slate slabs, or wood lined with metal—zinc or lead. We confess to a predilection for slate tanks. They are so easily cleaned, will withstand all chemicals, and are, generally, so pleasant to work with that we think everyone will endorse our opinion who has had opportunities of giving them a trial. But their great weight and want of portability is a serious drawback. When premises are to be altered or a change is contemplated in the internal arrangement of the laboratory or dark room, these immovable articles, when of considerable size, are too frequently in the way, and often prevent the carrying out of many of those little details of working that go to make a perfect whole.

Zinc or lead-covered wooden structures, therefore, remain to be discussed, and there is not much doubt that the former, from its greater cheapness—that is, for a given amount of superficies—is preferable. But we would here point out that, though cheaper, it is possible for zinc to be less economical; for it is always used so much thinner than its rival, lead, that it will not stand much wear and tear, and it is quite out of the question to use it for holding or carrying off chemicals. Acetic acid, citric acid, and hydrochloric acid—all of common use in wet-plate work—will dissolve it with the greatest ease, and if not rigidly excluded (a difficult matter in studios where many hands are employed) they would cause holes to be formed in a very short time. Another objection to zinc is the difficulty there is in making it lie flat and even. Owing to its rigidity, compared with lead, it is next to impossible to make, for instance, the bottom of a washing tank quite flat and level. The effect of this drawback is to increase the quantity of fluid which is required to be put in the tank before a plate of glass or a sheet of paper could be entirely covered by the contained liquid—a consideration of some importance in developing carbon prints with a limited supply of hot water.

We have had an opportunity of comparing notes with a photographer who three years ago had fitted up an extensive series of zinc troughs for carbon work. He informs us that the strictest orders were given to keep out all chemicals, and yet he discovered the junior hands in more instances than one pouring acid water from plate cleaning into one of the less-used troughs. The result of that and other causes has been that on the prominences caused by the "buckling" of the zinc a number of minute holes were formed, and made their existence evident by the water finding its way through them and leaking out of another part of the wood casing, thus rendering it most difficult to find the source of the leaks in the metal. It was only after a considerable time that he discovered the true state of the case, the presence of the holes not being anticipated, search thus being made in the wrong direction.

It is evident, therefore, that lead—whose good chemical resisting properties and power of standing rough usage are well known—must form the most suitable material for all such purposes, and to any photographer who contemplates fitting up tank work for carbon printing we strongly advise its use in preference to zinc.

It is, of course, very much more expensive, comparatively, at first; but in case of alteration it can always be disposed of for almost its original cost, while, again, it is made up more cheaply than zinc. We have instituted some inquiries as to the relative expense of the two kinds of sheets respectively, from which our readers can make their own calculations. Both materials are sold by weight. Sheet lead suitable for such troughs is sold at about threepence per pound, a suitable thickness weighing three pounds for every foot, thus making the cost one shilling per foot. Sheet zinc costs about fivepence per pound, but, when of common thickness, weighs only three-quarters of a pound to the foot, the cost being under fourpence per foot. The thickness known as "number twenty-five gauge" is what would be usually supplied by the zinc worker, and this, being nearly ·02 foot in thickness, its easy penetrability with the slightest rough usage could be predicted safely.

We think our readers have here sufficient *data* to form their own conclusions; and we hope to hear that the desire to introduce carbon working may cause the erection of many more lead troughs before the year expires.

There are many amongst our readers who follow not only the chemical and artistic branches of photography, but also find pleasure and occupation during the winter months in the various mechanical departments connected with the art, and not a few have proved themselves no mean adepts in the planning and construction of the various pieces of apparatus in general use. We had an opportunity recently of examining a camera of amateur construction, which, in addition to the ordinary arrangements combined in such instruments, presented one or two novelties worthy of adoption by those who delight in the construction of their own apparatus, as well as by the professional manufacturer of such articles. The first was a novel method of hinging the shutters of the dark slide, or, more correctly speaking, a substitute for hinges. Everyone who is acquainted with the operation is aware that a very great amount of care is necessary in making the hinged joint, in order to combine neatness of appearance and a total exclusion of light; while those who have worked much in the field know how easily the hinges become strained and the joints leaky, especially when using large sizes or in windy weather. The adoption of the novelty we are about to describe causes all these troubles to disappear, without in the slightest degree interfering with the convenience and utility of the slide. The shutter when closed presents no difference in appearance, except that the two hinges are replaced by a pair of plain brass plates of similar or slightly smaller size. Upon drawing out the shutter, however, to its full extent, the larger portion (which usually folds to the side of the camera) becomes wholly detached, leaving the shorter piece remaining in the slot to prevent the access of light to the plate during exposure. Upon examining the detached portion it is found that the under sides of the brass plates (which now project over the woodwork) are furnished with a short pin each, the pins fitting into corresponding holes in the shorter part of the shutter. In this manner they act as clamps to keep the two portions of the shutter in close contact until the longer one is drawn clear of the grooves in which it works, when it may be "unhooked," and all danger of tremor in the camera or of injury to the shutter itself by the wind or accidents is removed. The exposure completed the pins are re-inserted in their sockets and the slide pushed home, when the two portions are again as firmly held together as if attached by hinges. The second novelty consists in the arrangement of the swing back. In ordinary landscape work the swing back is rarely required, but cases do present themselves occasionally where it is useful, while for architectural subjects it is a necessity; for which reason many operators are loath to dispense with it although deploring the increase of bulk it gives to the camera. This difficulty is surmounted in the following manner:—The ordinary fixed centres upon which the body swings are replaced by a couple of milled-headed screws working in corresponding nuts attached to the back of the camera. The screws when loosened slide in horizontal slots in the side plates connecting the back part of the camera to the central body, and at each end of the slots there is a depression into which the shanks of the screws drop when pushed to either end. The edges of the two portions of the body are cut square so as to fit closely together when closed, and thus the space usually cut away to allow the swing is saved. When thus packed the camera is virtually without a swing back, but by loosening the binding screws and changing their position to the opposite end of the slots the swing comes into operation, the back being retained in any desired position by again tightening the screws. As a swing back the arrangement is neater than, and equally as efficient as, the ordinary system, while it has the advantage of the decreased bulk of the non-swing-back camera. We have pleasure in recommending these two "innovations" to the notice of those interested.

A PLEA FOR EXTRA SENSITIVENESS.

The article in last week's issue questioning the desirability of great sensitiveness in dry plates will, I think, be challenged by many in spirit if not in writing. I know of many who are not likely to go back to plates requiring long exposures.

The drawback in quick plates which you appear to lay most stress on—namely, the difficulty in giving correct exposures—I fail to see. If a tannin plate require (say) five *minutes* and a gelatine five *seconds* for correct exposures, why should it be more easy to expose the former correctly than the latter? You say (if you will excuse my quoting) that a minute or two more or less may possibly not greatly influence the result in a slow plate; but I conceive that it influences it *precisely* in the same proportion as in the more rapid one, let the exposure be hours, minutes, or seconds. If two plates require respectively five minutes and five seconds for correct exposures they will be equally over-exposed if they receive respectively six minutes and six seconds. The same difficulty lies with each—the quick *and* the slow—properly to judge the time required for them; and when that is arrived at the rest is a mechanical arrangement of uncapping and capping the lens common to both. I could refer to several professional and amateur photographers who can expose gelatine, washed collodion, or tannin plates almost to a certainty and with *equal exactness*, whether it be they have to count minutes or seconds.

The quality of the negative is another matter—I presume you allude to the printing qualities; but as you say "the quality of the result," it may refer simply to the prettiness of the negative, in which case, perhaps, collodio-albumen might hold the palm against any other process. As regards printing qualities, however, I always reckon that the more sensitive the plate the softer the print, and the greater amount of detail in the shadows—details which are altogether omitted in the slower plates. Suppose that you expose a tannin or any other kind of plate that requires a matter of minutes for exposure—subject: looking down a stream, heavy foliage on both sides and depicted on each side of the focussing-glass, and say the correct time is two minutes for exposure—now, I have had enough experience with these slow plates to say that if you left the plate exposed twenty minutes you would not get the trace on your negative of a piece of dark rock which, we will say, you can just see *ought* to be in the negative on one of the margins of the plate. It ought to be there, because, although the rock is shaded by the trees, it is visible to the unassisted eye, and is within the field of the lens. You might expose the plate until the sky and water were completely solarised, but those very shaded details do not appear on the negative. Apply now a gelatino- or even a good washed collodio-emulsion, such as are now advertised as "quicker than wet," and in either case you get the detail. The more sensitive the plate the more *equally* do all the different gradations of light act upon the plate.

Take another subject—say a man twenty yards off, who happens to be standing in your field of view with his hat on, illumined by direct sunlight: the forehead, with tannin or collodio-albumen, is not represented; it is a black shadow and nothing more. With a wet plate you may get slight detail, but most probably still a blank; with a good washed collodio-emulsion you get a little detail; but with a gelatino-bromide plate it is represented as in nature. You say—"Let anyone who doubts this explain why wet-plate work, as a rule, is superior to dry." I think the passage might have read why a wet plate is superior in some respects to a dry one—the "some respects" referring to regularity of appearance and *regularity* of printing qualities, because with a wet plate and a gelatine one no one can well deny that, supposing they have both been properly exposed for the high lights, the latter has infinitely more detail in the shadows than the former.

Many of your readers, I think, will now only allow the precedence as regards regularity, and the reason to me is obvious: the operator has his tent, and his first exposure, if incorrect, can be rectified in the next. Should a plate be faulty he can try again, and he leaves the spot only when he has secured a good negative. The inferior ones (supposing him to have perpetrated a bad one) are not brought home. But this does not occur with the much-to-be-pitied dry-plate worker; this unfortunate man, whether he be "slow" or "quick," carries them all home faithfully in his changing-box, right or wrong. Give him the same facilities the wet-plate worker has, viz., a tent, &c., and there is no reason why after once having tested his plate he should not work with the same regularity with regard to the appearance of his plates as the happy wet-plate worker. The reason in my mind why so much irregularity appears in a batch of exposed dry plates—the result of a day's photographing—is that, in consequence of the difficulty of hitting the right exposures without first having had the advantage of being able to test a plate on the spot, the operator, by using more or less pyro. or ammonia or silver in order to thereby correct in his operating-room the faulty exposures made in the field, alters and makes irregular the tones of his negative—a fault which is common to *both* quick and slow plates. With those, however, who are most apt, and those who have the most experience in the field, this fault is reduced to a minimum, and the working is now brought by some to a certainty perhaps greater than can be obtained with the wet process. C. BENNETT.

DEVELOPMENT AND RAPIDITY.

WITH respect to the letter of "R. D. P.," which appeared in THE BRITISH JOURNAL OF PHOTOGRAPHY of the 5th instant, I have first of all to offer as an explanation of my not having sooner alluded to it the fact of my having been on the continent visiting, among other scenes, the great international exhibition in Paris, from whence I have only just returned.

While I quite agree with all that the Editors have said respecting the action of the various kinds of alum, I think that the Edinburgh correspondent who makes use of the above initials will, upon investigation, find a clue to all his troubles by detecting that his sample of alum contains a chloride. This he can easily ascertain by making a solution of the alum in distilled water and adding to it a solution of nitrate of silver. The formation of a white, flocculent precipitate (chloride of silver) will determine this point. Should such a precipitate be formed the probability is that the alum contains a chloride.

I have now to direct attention to another matter. It is still fresh in the recollection of the readers of this Journal that M. Boissonnas, of Geneva, exhibited in London last year a number of portraits of children and groups taken with extreme rapidity; and it is almost equally well known that M. Klary is giving demonstrations of the rapidity of this process to those visitors to the French exhibition who choose to call for that purpose at the studio of M. Franck, of Paris. Being desirous of ascertaining for myself the precise ratio of the sensitiveness said to be obtained by the Boissonnas' method, I took to Paris with me a portion of my own collodion, bath, and developer such as are in regular use in my studio in King William-street, and by the courtesy of MM. Boissonnas and Klary was permitted on more than one occasion to try my chemicals and method of working against theirs. Seeing that I was successful in this competition the result could not be otherwise than gratifying to me, and both of the gentlemen named did me the honour of asserting their belief that I worked with a briefer exposure than any other photographer whom they had met. I explained to them that I made use of a process in which there was little, if anything, that could be termed new, and that the great rapidity was mainly due to the wonderful clearness of the Paris light, which I found to be greatly superior in actinism to that of London.

Having been informed by M. Klary that he intends visiting London in a few days to demonstrate the Boisonnais' process, I have offered him the use of one of my studios provided he can satisfy me that there is something really novel or good in his method of working. In the meantime I shall, in a short time, have great pleasure in sending to this Journal for publication the fullest details, including formulæ, &c., of the method I adopted on the competitive occasion referred to. A. L. HENDERSON.

PHOTO-ENGRAVING.

THE above heading, properly speaking, would include a great deal more than could possibly be embraced in a magazine article, even in the most condensed form. I therefore intend to treat only of the method practised in obtaining relief plates in metal from line or stipple pictures, of which the illustration in this number is a sample. This picture is a reproduction of a steel-plate engraving published in the London *Art Journal*, by the process invented by Mr. L. E. Levy and myself, and which we patented in 1875. Of the merits of the picture I will leave the intelligent reader to judge. I believe, however, that it is as close a reproduction of the original as could be obtained *in a relief plate*, as it must be borne in mind that these prints are made by the ordinary printing press, and are not like the *intaglio prints* from the original plate, but, as compared to those, very cheap productions.

Of the influence exerted by the various and steady improvements in photo-mechanical processes within the last fifteen years on the profession it is almost impossible to form an estimate. It has placed photography in the front rank of the graphic arts. Who that has seen the productions of the Albertype, Woodburytype, heliotype, and other similar processes for half-tone work, and the reproductions by photolithography, photogravure, and last, but not least, the multitude of newspaper and book illustrations by photo-relief plates, such as the illustration in this number, has not felt on beholding them that photography, as a profession, was worthy of the greatest effort and the most subtle skill, and that its practical application extended to almost boundless limits! And all these are produced by the direct agency of the camera.

Since the first rough proofs by Paul Pretsch, of Vienna, were exhibited, the progress in this branch of the art has exceeded the most extravagant anticipations. Very few can appreciate the patience and effort of the comparatively few workers in this direction—the difficulties, disappointments, and repeated failures that had to be overcome by them before success had crowned their efforts; as it must be remembered that all these inventors had to treat with a very peculiar and (until recently) unreliable agent—gelatine rendered sensitive to light by the chrome salts.

The following is the method employed for obtaining relief plates in metal from line and stipple work and engravings, as practised by the Bachrach Photo-Engraving Company, of Baltimore, and the Levytype Company, of Philadelphia.

First, as to the original. When it is a print of any kind, it should be in pure black on a white surface to produce the best results. When it is a drawing or original design, it should be made with a pen in thick black India ink or colour, every line clear and distinct, on white paper, or, still better, enamelled cardboard, as the enamel can be easily scratched away for an erasure, or when a line is too thick, &c. The best results are obtained when the drawing is two or three times as large as desired, and the lines made in proportion, so as not to be too close or too wide apart for the proper effect.

The next, and almost the most important, part of the process (and this applies to photolithography as well), is the making of the negative. First, it must be extremely sharp to the edge, the lines being absolutely rectilinear, and only the best lenses can be used for this purpose. The sensitive plate must be absolutely plumb with the picture on the copying-board, and the exposure must only be just sufficient to give absolutely clear glass in the lines. The opacity must be as great as possible in the lights, and for this purpose I will give a special method of intensifying. I will here remark that unless the negative comes up to these requirements all subsequent steps will result in failure. The best collodion for the purpose is that containing very little of the bromide and a large proportion of the iodide salts. I prefer a bath made in the usual way, and then fused to the "oily" state, with which method, no doubt, all are familiar. It should be neutral, or very slightly acid. It must be remembered that the result aimed at is the very opposite of what we strive for in our usual work—that is, we want absolute blacks and whites. The double sulphate of iron and ammonia is the best developer when used with a large proportion of acid, it having the least liability to deposit on the blacks. I use glycerine with my acetic acid No. 8 in the proportion of one ounce to one pound of the acid. It is also a help in this direction. The fixing must be done with cyanide of potassium, and the plate then thoroughly washed. I next flow over a solution composed of one ounce of sulphate of copper, two drachms of bromide of potassium, and twenty ounces of water, till the negative has assumed a white appearance all through, and then wash again thoroughly. I next *immerse* it in a dish containing a twenty-grain silver solution, slightly alkaline, till it is completely blackened, and then wash it again. If it is not intense enough yet, the last two operations must be repeated until it is. If there is any dirt on the glass (to avoid which use albumenised glass), or it has been over-exposed in the camera, the lines are liable to be covered more or less; and in this case it is worthless, as in such places the lines do not come up to the same plane as the rest of the picture, on account of receiving a much less exposure to the light in the next operation, for it should be remembered that every line on the printing block must come up to the same plane.

Next comes the preparation of the gelatine plates. Dissolve one ounce of Cox's or Nelson's gelatine in eight ounces of water, in a small portion of which one drachm of bichromate of potassium has been previously dissolved in a separate vial. After the gelatine has been dissolved by heat in the usual way this should be added, and the whole carefully strained. Put carefully-cleaned glass plates on levelling shelves in a dark room free from dust, and level each plate with a spirit-level. Then pour the gelatine solution upon the plates to the proper thickness—this depending on the class of work desired—and keep the room at a uniform temperature until the plates are entirely dry. This is a very important operation, as the nature of the lines will be governed in great measure by the temperature used, as well as the exact amount of the chrome salt in the solution.

We can obtain lines varying from being round at the bottom to perfectly flat ones (the kind usually desired), and even to *cup*-shaped lines. This can be learned only by actual practice. After the plates are dried they should be wrapped up carefully and excluded from light and air. They will keep in this condition for two or three weeks, and sometimes even longer. The exposure under a negative must be conducted in such a manner that the rays of light fall constantly at right angles to the plate, for which purpose a long box arranged so as to have a parallactic motion similar to a telescope, and denominated a "heliostat," is used. In sunlight the exposure averages about ten minutes. On dark days we use a large condensing lens, under which we expose usually from four to six times as long as in the sun's rays. There must be absolute contact between negative and plate, consequently perfectly flat glass should always be used. After exposure the plate is immersed in cold water, and at once a curious phenomenon occurs. Those parts of the plate not exposed to the light *swell* by the absorption of water, while those exposed remain unaffected. This, it will be seen, forms the relief. As soon as this action has begun all over the plate, we plunge it into a twenty-grain silver solution till the relief is high enough, *but not a minute longer;* for if the action is carried too far the lines become rounded at the bottom, and sharpness is lost, This part of the process is very important, and is our original invention. We have patented this step particularly, as it is peculiar to our process alone. The advantage of this operation lies in the fact that it sharpens the lines, and allows of greater relief being obtained without injury—very important for practical printing qualities—which advantage is recognised by printers using our cuts, which they prefer on this account over those made by other processes. The film, becoming full of bichromate of silver by this step, obtains greater consistency and solidity, and is capable of standing more handling in the subsequent steps. We have thus far found nothing that could equal this method in the results obtained. In our original invention we now proceeded to prepare the plate for direct action in the electrotype battery; but we have abandoned this for a more practical method, the copper facing of the cut not allowing of such easy retouching and finishing.

After the plate is properly swollen it should be rinsed with water, and a saturated solution of the sub-sulphate of iron poured over it. At the same time plaster of Paris must be mixed to a proper consistency, the plate put upon a level surface, the casting irons adjusted, and the plaster then poured into the mould thus formed. This should be mixed very thin, like cream, and only enough to cover the surface poured on and air-bubbles removed, when the balance must be added and allowed to set till sufficiently hard, which will require from fifteen to thirty minutes. The irons may then be removed and the cast separated, which will generally come off perfect. If not, another must be made at once. Those lines that were sunk in the plate will be raised in the cast, which is then right, or, as we term it, a negative. From this we take another mould, by first covering it with a solution of one part of silicate of potash to three parts of water, pouring off the excess and allowing the surface to dry somewhat, and then making the mould by again placing the casting irons around it and repeating the former operation.

This second cast is then put in the stereotyping pan, and a metal plate cast therein. It is not within the province of this article to give a description of this process, it being really another business entirely. After the metal cast is completed it is routed in the wide spaces where the relief is not sufficient to prevent the roller from touching while being inked in the press, defects are corrected, and the plate improved wherever possible with the graver. It is then mounted on a level block of hard wood, type high, and is now ready for the printing-press.

The entire operation I have described, from the making of the negative to the completion of the engraving, is often done in our establishment in four to six hours, when specially hurried; but we usually deliver work in three to four days from the time of receiving the order.

By the various processes of this kind, in the United States alone, there is probably produced as much work *as a thousand wood engravers could do if constantly employed,* and some of the work, such as very small reductions, &c., could not possibly be done by any other means. This has all been accomplished within the last ten years, and the field is constantly enlarging, more especially in the reproductions of foreign works.

I have endeavoured in this article to give a brief history as well as description of the processes employed in this important branch of our art, and hope that more of those who have had experience in this line will give us the benefit of their knowledge.

—*Photographic Rays of Light.* DAVID BACHRACH, JUN.

CARBONATE OF SODA.

As this preparation is frequently used by the photographer, more especially since the introduction of alkaline development, the ability to distinguish good from inferior samples is a matter of some importance, as the success or failure of a troublesome experiment may and does, in a great measure, depend upon the quality of the chemicals used. The failures we see recorded from time to time in our photographic literature would probably be explained if the quality of the chemicals was rigidly examined.

The purity of carbonate of soda, being an article of everyday use, is, as a rule, taken for granted, its comparatively small cost being considered sufficient warranty for its unsophistication. Carbonate of soda at a penny an ounce, or two ounces for three-halfpence, should be avoided by the photographer as utterly unsuitable for his work, and likely to lead him into difficulties. I had occasion during this summer to purchase a packet neatly done up, sealed, and labelled "best carbonate of soda;" but, to my surprise, litmus paper placed in a solution of it was changed bright pink. How such an impure sample would influence the delicate reactions that take place in the development of a dry plate the reader must determine. I merely call attention to the fact.

Carbonate of soda is the usual designation of bicarbonate, sesquicarbonate, or carbonate—each preparation differing from the other, sometimes considerably, so that a loose nomenclature of this kind is apt to mislead and is much to be deprecated. The differences in these soda preparations are these:—Washing soda is a very impure carbonate, containing about twenty-two per cent. of real alkali; pure carbonate of soda is the same, *minus* impurities; bicarbonate or sesquicarbonate—an appellation used indiscriminately—contains about forty per cent. of real alkali, being, therefore, much stronger than the carbonate. It is the kind usually prescribed, and for general purposes is the best preparation.

In purchasing, "Howard's" best bicarbonate of soda should be asked for. It is usually kept by all respectable chemists, and is acknowledged to be the purest make and a thoroughly reliable article. The price is rather higher than that sold in packets, but the little difference is unworthy of notice. Unless, therefore, "carbonate" is expressly prescribed, Howard's bicarbonate may be safely used for all purposes that carbonate of soda is generally used for, especially for those purposes for which the photographer is likely to require it. EDWARD DUNMORE.

TRANSATLANTIC NOTES.

NEW YORK.

BEFORE speaking of this great city, as this will for the present wind up my series of *Transatlantic Notes,* I had better, as my note-book has come to hand, redeem my promise to give the formula by which Mr. Davis, of Niagara, gets very rapid results. He is evidently a disciple of Mr. Black, of Boston, so far as the bath is concerned, as he works it in a very acid state, and of a strength of forty-five grains to the ounce. To a hundred and forty ounces of this he adds sixteen ounces of nitric acid, and should it not work to his satisfaction he continues to add more and more till it does. His collodion, of which the ether and alcohol are in the proportion of twenty of the former to sixteen of the latter by weight, is—

Ether and alcohol	1 ounce.
Iodide of lithium	5 grains.
Bromide of lithium	$3\frac{1}{2}$,,
Anthony's soluble cotton, No. 1	*q. s.*

Bromide of ammonium may be substituted for the bromide of lithium, but he considers the lithium base essential in the case of the iodine. The developer is made as follows:—four ounces of refined sugar, and twenty ounces of iron and ammonia sulphate are dissolved in a sufficient quantity of hot water and boiled, with constant stirring, quite dry. This is dissolved in water in the proportion of one ounce to four, and just sufficient acetic acid added to prevent fog. Mr. Davis claims, on behalf of this solution, that development may be pushed to any extent, and protracted to almost any length of time, without producing fog or getting muddy from reduction; and that, consequently, an image may be developed to printing density with a shorter exposure than by any other solution that has hitherto been proposed.

Anyone attempting to "do" New York, or even to examine any one of its many industries, in a few days, will certainly fail, and therefore I contented myself with brief visits to a few of the better-known establishments connected with photography, and with such opportunities of acquiring a knowledge of the position of the art in that city as was afforded by the show-cases in the various streets through which I passed.

Probably one of the most interesting places to a photographer is the immense establishment of Messrs. E. and H. T. Anthony and Co., which occupies an entire block of building in a central position in Broadway. I got a cordial reception from two members of the firm, and my request for permission to make a general inspection was heartily complied with, Mr. H. T. Anthony himself offering to be my guide. The firm of E. and H. T. Anthony and Co. is one of the oldest and best known in the United States, and there is hardly a photographer from Philadelphia to California who has not dealings with the house, either directly or indirectly, as there is not an article in any degree connected with photography that they do not either manufacture or supply. From the first floor to the attic the establishment is like a busy hive, and contains probably the most complete and the largest stock of photographic material to be found under one roof in any part of the world.

One floor is devoted almost exclusively to posing and studio apparatus, including cameras and lenses of every description; another to albums, velvet, and other ornamental frames, the former varying in price from eightpence to as many pounds; another to chemicals and chemical apparatus, including enormous quantities of collodion of various kinds, a favourite variety being partially sensitive to light even before immersion in the nitrate bath. In connection with this department I noticed a habit which might be adopted with advantage by chemists in the old country, namely, the almost universal use of square instead of round bottles—a form which economises room, and admits of much easier and firmer packing.

Here I saw large quantities of the bath and developing solutions used in what the Americans, with their usual aptitude in selecting names, call the "lightning process," but which in more prosaic England is announced simply as Boisonnas' "extra rapid." I could, however, get no information regarding the nature of the solutions, neither have I met anybody who has given them a trial; but I heartily wish the inventor all success, as, if there be really anything in it, it comes just in the nick of time to enable wet collodion to hold its ground against the numerous extra-rapid emulsions that at present threaten to supersede it for quick work.

Messrs. Anthony and Co. are extensive and enterprising publishers of photographic pictures, being ready to purchase suitable negatives whenever they are offered, and also sending out their own *employés* to produce whatever is likely to become in demand. In this department I saw what is, perhaps, one of the largest stocks in the world of prints ready for the market, varying in size from stereo. up to 14 × 11, the latter size including some fine transparencies on glass, printed in carbon. Of those I was particularly charmed with some statuary in exquisitely delicate detail and perfect in the rendering of light and shade. They were evidently copied from fine statuettes, and with a perfectly black background; after development they are transferred to the glass in such a way as to leave a broad margin of clear or obscured glass. Running along this margin there was executed with much taste a border, either floral or geometric, and polished in the obscure, or obscured in the polished, glass. The picture was, as usual, protected by a second plate of glass, the two being bound together by a neat nickel-plated frame, and formed as beautiful a window ornament as one could wish to see. The only drawback to their general introduction will, perhaps, be the cost—forty-two dollars per dozen, or fourteen shillings and ninepence each, wholesale; but I think I could make a good thing out of them at less than half a guinea.

To keep their stock up Messrs. Anthony and Co. have three manufactories constantly going—two in New York and one on the Jersey side of the river. The latter is the chemical laboratory; but as it was pretty fully described in this Journal some time since, I shall only say that in it is made almost every compound used in the art, including eleven varieties of soluble cotton, and that every article produced is as nearly pure as it can be made—a matter of even greater importance here than in the old country, from the fact that the great majority of American photographers still continue to make their own preparations.

In one of this firm's New York factories I found several floors of a large building devoted to the manufacture of albums and ornamental frames, and as for the successful pushing of this branch of trade new styles must be constantly produced, the variety of designs is immense, and the range of prices very great. This latter may be judged of from the fact that the work actually in hand varied from twenty-four shillings to fifty-eight pounds, six shillings, and eightpence per dozen.

The manufacture of albumenised paper was also at one time a large item in their work of production; but, so far as I could learn, the continental makers have gained a good footing in the States. Messrs. Anthony and Co., however, make an excellent article, and the few girls I saw employed manage to turn out from twelve to fifteen reams a day, consuming in the process about fifteen barrels of eggs.

Notwithstanding the fact that some of the English camera-makers send out the most perfect work, both as regards finish and design, to be found in any part of the world, cameras of American manufacture have been for some time finding their way both into England and Scotland. Most that I had seen had been the work of the Scovill Manufacturing Company, and so I thought it advisable to have a look over their store when in New York. I had expected to find them makers of photographic apparatus only; but in this I was much mistaken, as they show quite a bewildering assortment of almost every little appliance in iron and brass that is in general use. The photographic department, however, was the only one that had a special interest for me, and the examination of the various items amply repaid me for the time it occupied. The space at my disposal will not permit of anything more than a general description of the stock as a whole, and therefore I may just say that its characteristic is great strength, excellent fitting in all its movable parts, nickel-plated metal instead of brass or iron wherever possible, and considerable disregard to the element of weight, even in folding landscape cameras, or "view boxes," as the Americans persist in styling them. The studio cameras, with their various movements, are decidedly superior to anything usually made in England; but English makers have nothing to fear from American competition in those intended for landscape work, as, in addition to the clumsier appearance of the American article, it is generally much heavier than it need be, and has nothing approaching the perfect finish of the English work.

Much the same may be said of the camera-stands. Those for use in the studio are very perfect in their movements, and their unusually-great size is a real advantage; but the tripods, with unseemly wooden tops, instead of the light ring or triangle usually seen at home, are not more rigid, though much heavier, than we are accustomed to see. Of course this applies only to the tripods of ordinary size; the extraordinary ones—and there were some nine feet high—needed all the strength they had to support the cameras for which they were intended.

I suppose the beautifully-artistic studies of Sarony are as well known all over Europe as they are in New York, being highly appreciated wherever they are seen. No doubt most people have an excusable curiosity to see the man who produces anything they very much admire, and I willingly plead guilty to that in the case of Mr. Sarony, although the curiosity was somewhat damped by the assurance of one of his intimate friends that, if busy, he would hardly take time to exchange the ordinary courtesies of life with the President of the United States were he to call. Trusting to the chance of finding him at leisure I went to Union-square pretty early in the forenoon, and had no difficulty in recognising the block of building occupied by this artist—which is five stories in height—by an enlarged copy in gold of his well-known signature by way of sign, which, however, is the only indication of his whereabouts, as there is neither show-case or specimen of any kind outside the building.

In common with the proprietors of most large business establishments in New York, Mr. Sarony gives his customers the choice of walking upstairs or going up in a hoist. My guide, choosing the latter, made the necessary signal, and in a few seconds we were landed on a level with the reception-room. This is a magnificent apartment of the dimensions of eighty-five by thirty feet, and covered with a rich Turkey carpet. In a recess at one side is a desk and small counter at which appointments are made and business transactions conducted, and every portion of the walls and much of the floor space is occupied by a fine collection of pictures, objects of art and of *virtu* generally, in bronze, terra-cotta, ivory, iron, wood, &c., &c., gathered, I understood, mainly by Mr. Sarony himself, from almost every quarter of the globe. Many of the pictures, including life-size drawings of Wilkie Collins and Mrs. Scott Siddons, are the work of Mr. Sarony, and bear ample evidence that his ability as an artist is not a whit behind his power as a photographer.

The floor above the saloon is mainly used as a workshop and store-room. Here the odds and ends of repairing, fitting, and altering, so essential to the apparatus and properties of a studio where the peculiar kind of work which has made Sarony famous, are done, and which is thus much better executed, while at the same time it is done under the artist's eye.

Still higher up we find a series of rooms shelved all round, in which are stored such quantities of negatives as one might suppose to have been the work of a whole lifetime, and amongst them, doubtless, many of those from which have been printed the artistic gems that ought to be in the possession of every photographer, if for no other purpose than to show of what the art is capable. Higher still, on the fourth floor, and in what at first seems a confused jumble of articles of every conceivable kind, will be found a seeming chaos of old furniture, armour, stoves, musical instruments, skulls—a place in fact like nothing on earth but the property-room of a large theatre during the run of a successful pantomine. Opposite the property-room are dressing-rooms, and beyond them is the studio, the place for which all the others exist, and where the principal artistic work that keeps this great establishment going is done.

We may not enter now, as the artist is engaged with a sitter, and so in hope that he may have a few minutes to spare shortly, we pass still higher up—to the roof, in fact—and see the printing operations. Here I found some half-dozen hands working under the superindence of the head printer—a gentlemen who has been in Mr. Sarony's employment for many years, and whose services are highly appreciated. The paper is fumed with ammonia—a practice almost universal in America—and the printing is all done in the open air. At the time of my visit there were nearly three hundred negatives in use, one hundred and seventy-five of which were being vignetted; and all, or nearly all, were printing under tissue-paper. The vignetting is done through masks of orange-coloured paper, each negative having one suitable to itself cut out and pasted on the outside of the frame, and over it the tissue paper. An examination of the negatives showed that retouching was not resorted to to any extent; in fact, the removal of an accidental blemish, or the softening of a too dark shadow, is all that is permitted or required.

By the time the printing had been examined Mr. Sarony was disengaged, and on presenting myself in the studio I got a hearty but characteristic reception. I handed him my card and was about to say something in the usual style, when he shook hands warmly, and thus expressed himself, without a pause, or giving me the chance to say a word till he had taken a good negative of me. "I'm very glad to see you," wheeling me into a corner; "beautiful lines! ah! that's just the style! oh! you need'nt look at the place; I like to have everything rough and ready, and the light is quite good enough. A man's not worth much if he can't get a picture under almost any light." Throwing an old blanket over one of my shoulders, he exclaimed—"There! that's it now! true art! never touch a bit of drapery; if it don't fall right throw it again—it's sure to fall better than you can make it!" He then said to his assistant—"All right!" and then to me, waving a card in his hand a little above the level of my eye, and about eight feet off—"Look this way, and let your eye follow the card." "Go!" and after an exposure of about thirty seconds, at the end of which the lens was capped and the assistant disappeared, he resumed—"Stand where you are for a few seconds; I don't often go twice, but sometimes have to do so. Very picturesque! charming! Nothing like a loose, flowing robe to work with—the dress of the nineteenth century is a vile abomination!" A whistle was heard from the adjacent dark room. "You're all right. Where are you to be found? and when do you go? I can send you a proof tonight, and, if you like, will also send a bundle of my best studies." I told him, and, hardly giving me time for thanks, he again shook hands in the unmistakable way which says it is time to go. I may add that I received at my hotel that same night the promised proof, and two dozen of the most perfect gems of photographic art he has ever produced, and since then a number of prints from the negative of myself, which, as an art study, is almost perfect. Mr. Sarony's light is like that very common in American studios—a low top; and he makes but little use of screens, trusting for the desired effects to the position, relative to the glass, in which he places the sitter.

There are several other noted photographers that I would fain have visited, but time would not permit, and a hurried look at their show-cases was all that I could accomplish. From this I am satisfied that New York is no exception to the general rule prevailing in all, or nearly all, large cities, viz., with a very little of the finest of the wheat there is a large proportion of chaff—a few good men and true, who aim high and succeed in doing really excellent work, and a large number who would seem to regard their work as mere matter of routine, seeking nothing higher than what may be required by the uncultivated tastes of their *clientèle*, and aiming at no higher reward than the *quid pro quo* which such work brings.

While in New York I had the privilege of attending a meeting of the Photographic Section of the American Institute, under the presidency of Mr. H. J. Newton; but as I see a report of that meeting in a recent number of the Journal I need not say anything further regarding it, except that the pictures shown by the President, most of which are now before me, were, notwithstanding the short exposures, admirably lighted and really excellent, and that the members present showed a zeal and energy that should secure for the Society a useful future.

Now here must for the present end my *Transatlantic Notes*. The gathering of them has been a pleasant occupation, and I most heartily recommend a similar trip to all who may have the opportunity of visiting America. JOHN NICOL, Ph.D.

THE BIG SHOW.

OUR EVENINGS.—PARIS SHOW-CASES.

UNDER the influence of a broiling sun we find it weary work this all-day-search after improvement combined with pleasure; and so, with the conscious feeling of fatigue, to be forgotten amidst the courses—not of nature, but of a good dinner—we made for the principal entrance to the Exhibition, to be whirled home in the first swift conveyance that could be had for hiring. This, however, is no easy matter to obtain, for many visitors with the same intent as ourselves are there before us; and in the midst of the demand for *voitures* the *cochers* forget all rules and regulations, and make it their business to take the lightest weight the shortest distance for the most money. So cheap has money got amongst the *cochers* that a half-franc piece cannot even secure politeness from them. With the exercise of considerable force, and the expenditure of a fair quantity of bad French mixed with hard English, we manage to obtain a *voiture* and get home in time for dinner.

By way of amusement after dinner we saunter round the Palais Royal, feasting our eyes on the never-ending display of jewellery, and then take a walk along the principal boulevards; but it is wonderful how soon a little of that sort of thing satiates one. It is new to see the crowds of people sitting round the doors of the *cafés* under the shadows of the trees enjoying their cigars and *café-au-lait;* but, as it repeats itself again and again, the novelty soon wears off, and so we sit down amongst the crowd in front of one of the *cafés* to enjoy a view from the other side, and have a look at the passers-by.

But sitting outside at little white tables on cane-bottomed chairs, and drinking coffee mixed with water grew tiresome, and we resolved to try the theatre. That was not much of a success either; for, what with the heat of a summer night and being packed into a crowded house, backed up by the fact that we did not understand a single word of the performance, the whole arrangements act as a soporific, and we go to sleep.

We tried to obtain admittance into the New Opera House, but not having applied in time for tickets we failed. So should any of the readers of the Journal who intend visiting Paris wish particularly to see the New Opera House, it would be advisable to apply for tickets on their arrival in Paris, by which means they will have a fair chance of getting them during their stay. We tried to get in without tickets for the sake of getting a glance at the house, but we had to stand in the *queue*—an arrangement which we, in our own country, would do well to imitate, so as to save many of the abominable crushes and crowds that occur at the doors of places of amusement previous to the doors being opened. In Paris they do these things differently. On reaching a place of amusement previous to the doors being opened all comers stand two and two behind each other, and, no matter what be the length of the line, they preserve this form until the doors are opened, patiently waiting without crowd or bustle, first come being first served, and when the place becomes full those whose turn to enter has not come walk quietly away, which was precisely our case on this occasion. The justice of this sensible arrangement of the French people is this—the weak have an equal chance with the strong.

The photographic cases and show-frames exhibited in connection with the places of business in Paris are in many instances different from, and an improvement on, those usually shown by us. Some photographers have the whole entrance way or passage to the stair-case glazed in the form of a window about two feet wide, and running all the length of the passage both sides. These windows are usually draped with maroon-coloured cloth, and filled in with framed enlargements, plain and coloured. At night the effect is striking; for these windows are all lighted up, and the pictures thus show with even more effect than during the daytime, and is a means of causing many of the passers-by to stay and inspect the work.

In one instance I saw a very pretty effect produced by showing one single enlargement, framed and beautifully finished, placed on an easel in the centre of a window, and draped all round with folds of maroon cloth. When looking at this picture and its arrangement I thought that the effect produced by this one specimen in the position in which it was placed, and its subdued, artistic surroundings, would do more as an advertising medium for the photographer than if he had had twenty samples crowded into the same space.

We saw a moving advertisement in the shape of a little square van drawn by a pony, the back and each side of the van being squares filled in with samples of the artist's work. It had the advantage of bringing the quality of the production under the notice of many who might never have the opportunity of seeing the specimens at the entrance to the photographer's studio. MARK OUTE.

FOREIGN NOTES AND NEWS.

GRANULAR PHOTOLITHOGRAPHS.—WOOL AS A FILTER.—HÄRTWIG'S COLLODION.—SIEMENS' PRESSURE-HARDENED GLASS.

DR. SCHNAUSS has been authorised by Professor Husnik to publish the following account of a method for obtaining granular pictures on stone by means of the photolithographic transfer paper of the latter:—Take a finely-ground plate and rub it, as for a copperplate, with weak, fatty printing ink, and then with a coarse, but not thready, well-washed cloth, rub until the ink only remains in the hollows. Then place the plate in a horizontal position and coat it with a mixture of a one-to-ten gelatine solution containing three parts of spirits of wine and one-sixth of glycerine; make perfectly dry, and then draw off the skin of gelatine. The latter now possesses a very beautiful granularity, and should be kept between the leaves of a book, as it is easily injured. In printing with the chromated photolithographic transfer-paper lay the smooth side of the skin upon the negative and the paper upon the granular side, and print four times as long as usual. In washing off the ink a fine, soft, wet sponge must be used with great precaution, for fear of injuring the granulation; and the paper should be allowed to soak rather longer than usual in cold water previous to development, so that the slightest pressure may suffice to remove the ink from the unlighted parts. The shadows must be developed by a somewhat stronger pressure with a pointed piece of sponge, care being taken not to disturb the lights. This process is suitable for large pictures.

In the *Photographisches Wochenblatt* Herr Wilde says that he finds unspun, well-washed sheep's wool the best thing for filtering collodion or emulsion. It is superior to cotton wool, and when placed in the neck of the filter, owing to the greater elasticity of its fibres, it does not get matted, and the filtration goes on smoothly. The filtrate is very clear and free from all threads, dust, or other insoluble substances.

In the same journal Herr Härtwig, of Magdeburg, gives the following formula for a chloride of silver collodion, which is said to work well.

Prepare the following solutions:—

(1) 8 grammes of nitrate of silver in 8 c. c. of distilled water.
(2) 1 gramme of chloride of calcium in 20 c.c. of alcohol.
(3) 1 gramme of citric acid in 20 c.c. of alcohol.

Heat in a beaker 180 c.c. of alcohol, and add the silver solution drop by drop, stirring all the time. Now add eight grammes of collodion cotton (the solution can most easily be kept hot in the sand bath); then add, little by little, still stirring constantly, 150 c.c. of ether. Now take the twenty c.c. of chloride of calcium solution, which has been kept protected from daylight, and add it, finally adding the twenty c.c. of citric acid solution. The collodion has now got all its ingredients, and after standing a few hours is ready for use, upon gelatine paper, chalk paper, or direct upon glass. When used upon gelatine paper the toning is done in a soda bath containing gold.

In the *Mittheilungen* Herr Herrmann (of Siemens', Dresden) has a long article giving an account of Siemens' pressure-hardened glass. As *verre trempé*, he says, is best adapted for hollow articles, such as drinking cups and glasses, so is pressure-hardened glass best for flat sheets of glass, such as are used for windows and for *clichés*, both for ordinary photographic and lichtdruck purposes. For some time past Herren Römler and Jonas have tried pressure-hardened glass printing plates for lichtdruck both in hand and in Schnell presses, and are so well satisfied with the result that they have ordered a large quantity of all sizes. One printing-plate, eight millimetres in thickness and 45 × 32 centimetres in size, was laid directly upon the iron underlayer of the Schnell press and drawn fourteen times through the press, under the strongest cylindrical pressure, without breaking. Another plate, measuring also 45 × 32 centimetres, and five millimetres in thickness, also passed the ordeal triumphantly. The gelatine film adheres to the pressure-hardened glass much the same as to ordinary glass.

The Siemens' glass is also said to be suitable for ordinary photographic negatives or transparencies, being as level and transparent and not so liable to break. The hardened glass will be about thirty per cent. dearer than ordinary glass, and unfortunately it cannot be cut down to the desired size with a diamond, though it may be ground, polished, or bored. It is said, also, to stand sudden changes of temperature remarkably well. Rumours are afloat to the effect that the newest thing in furniture is glass frames for chairs, &c., toughened either by De la Bastie's or by Siemens' process; but that report is probably only one of the numerous *canards* that are always rife on subjects upon which nothing is positively known.

Contemporary Press.

NICÉPHORE NIEPCE.

[Daily News.]

Nicéphore Niepce, according to a recent biography, "never ceased being unknown till the seventh year after the end of his laborious life." As Niepce's laborious life ended about fifty years ago, it is certainly high time that "his posthumous notoriousness overpassed the bounds of a strait circle." This is the opinion of the brave people of Chalon-sur-Saône, whose fellow-townsman Niepce was, and who now assert his merits in a pamphlet written in the English language. We have already quoted two brief passages from the courageous work of the linguists of Chalon-sur-Saône, and they are enough perhaps to awaken some interest in the career of an ingenious man, "whose apotheosis was retarded owing to public error originating from an intrigue." "The very rare person hereby alluded to," as his biographer says, was born at Chalon-sur-Saône in 1765, and, in the opinion of the people of Chalon, was the father of photography. Up to the present moment no monument has been erected to the honour of Niepce, and the citizens of Chalon think it high time that his statue should decorate the market-place of his natal city. They point out the wonderful character of his invention. "It was not irrational to prejudge against the future inventor of photography that he had undertaken a run after a chimæra." This sentence illustrates a very common confusion of thought which may as well be cleared up before we pursue the history of M. Niepce any further. The chimæra was a fabulous animal, partly serpent, partly goat, and partly lion. It was excessively destructive in Lycia and the neighbouring district, and its appearance was dreaded by the surrounding peoples. No one would ever have dreamed of "undertaking a run after a chimæra," for the very good reason that the most reckless hunter would have been too much afraid to do so. In spite of these facts, not only English but French people, like the historian of Niepce, constantly talk of "pleasing chimæras," of "pursuing vain chimæras," and even of taking a run after the creature. To return to the early history of photography. The enemies of an inventor would have said, "Light is aught incoercible; there is no hold on it, and lo! you presume to enslave it?" People actually did speak thus to Niepce, who, in spite of the laughter and suspicion of his fellows, managed, with wretched materials, and "drugs of questionable genuineness," to make the sun "impress a neat and permanent image of the objects disclosed to view by its irradiation." So at least says the apologist of Niepce, and goes on to tell the old and trite story of inventive genius repressed and robbed by men of the world.

Niepce, it seems, was not satisfied with this first partial success. No one who remembers the early daguerreotypes, those hideous representations of the human features which had to be held on one side and squinted at, will wonder that Niepce was not satisfied. Mr. Leech's caricature, representing a happy family group before being "taken," and as they later appeared on the plate, was no exaggeration. The poem of "Hiawatha's Photographing" by the author of "Alice in Wonderland," is another monument of the old and evil days of the process. The bard tells how the baby "came out" so very badly that—

> In comparison the others
> Might be thought to have succeeded—
> To have partially succeeded.

Such partial success was not enough for Niepce, who knew that the public, like the "fools and bairns" of the Scotch proverb, "should not be allowed to see half-done work." In addition to his sensitiveness, Niepce's want of money prevented him from pushing his invention. Niepce had, however, a partner, M. Daguerre, if we rightly interpret the somewhat confused language of his biographer. A "painter and manager of the diorama," according to the biographer, got a hint of what Niepce was working at, and "drew out of his candour the secret of the proceeding." He then entered into formal partnership with the original inventor in December, 1829, and the act of partnership has been published. From this document, we are told, it appears that Niepce "had already found the fundamental means of rendering permanent the images received in the camera obscura." The great difficulty was thus overcome, and there only remained the task of improving the details. The partner "had lent cunningly to this second-rate task the seemingness of a mysterious indagation, tending to a personal discovery." Here the biographer has the advantage of his English readers. They cannot easily discover the mystery of this "mysterious indagation," and can only suppose that the partner improved the unpublished invention. Niepce died as unknown as he had lived, and his son, it seems, neither understood nor valued his discovery. The partner stood to Niepce as the inventor of a more or less indifferent modification of the boiler would have stood to the inventor of the steam-engine. In 1827 it is said that Niepce exhibited in England several heliographic drawings of his own, and some even earlier attempts are preserved in the Museum at Chalon-sur-Saône; "contrarily to which," says the biographer, "for the whole lapse of nine years, extending from the date of the contract to the divulgation of the proceedings, his partner never did show a single pattern of his own making, nay, to his surest friends." It is added that in 1839 Mr. Bauer, a member of the Royal Society, declared that the specimens of Niepce, exhibited in 1827, were as perfect as those of Daguerre, "described in the French papers of 1839." We do not gather from this statement that Mr. Bauer had seen the examples of M. Daguerre.

Sic vos non vobis might be the motto and device of inventors. If Niepce did and suffered all that is described, he was only suffering the usual fate of minds in which originality is stronger than self-assertion. Photography has been brought to considerable technical perfection; it is a useful (if not exactly ornamental) craft, and the people of Chalon-sur-Saône think Niepce should have his statue, like another. They ground his claims to this honour on the merits of the process he "invented;" but perhaps his modesty and perseverance are in themselves things more honourable than his disputed and doubtful success. Certainly the services of photography are many and meritorious, even if we do not actually think it "a condition of the spiritual life of all nations." The committee who ask for subscriptions for the monument point out that microscopic photography was of great service to Paris during the siege, as messages could be reduced in size, and sent out under the wings of carrier pigeons. Again: "with the photographist's assistance, the investigations for Verity cease being hard and liable to error; oftentimes he removes the doubts of justice," though not often, we presume, by the simple process of photographing the eyes of a murdered person, so as to get a portrait of the assassin. "Physic resorts to him as an infallible demonstrator;" and, in short, photography reproduces with mechanical exactness all objects in nature or art. Deductions have to be made, of course, from the value of the representation, which must always be more or less inadequate, and which has never the spirit, the life, the satisfying human qualities of the work of the artists' hands. It may be true that "photographic miniatures on enamel, set in rich medallions, are ranked among the accessories of an elegant dress;" but the value of Niepce's invention is rather diminished than increased by the coloured perversions of his process. In bad hands, and when set before dull eyes, photography is actually the rival and foe of art. Its real uses are ancillary and scientific; though, after all, the cheap portraits which photography makes possible are really valuable additions to the sum of human happiness. So hideous and vulgar are some popular photographs of eminent or notorious persons of both sexes that one is sometimes tempted to wish Niepce, Daguerre, and the others had exercised their inventiveness on some other material. The treasured photographs of the poor, the cheap comfort of the widow, or wife, or mother, atone for the monstrosities of popular photography, for the postures and attitudes of fashionable notorieties, and for the finery and flowers out of which women lift coquettish eyes to every owner of sixpence.

Our Editorial Table.

Catalogue of Photographic Specialities.

Liverpool: J. J. Atkinson, Manchester-street.

Mr. Atkinson's new catalogue has attained the goodly dimensions of 104 pages, every one of which bristles with information of a nature calculated to interest all who are connected with photography. One feature distinguishes this catalogue from many others: it is the number and variety of articles of American manufacture which are supplied by Mr. Atkinson, in addition to articles of home production. We find that several pages have been devoted to descriptions of lenses alone; some more to cameras, printing-frames, stands, and other accessories. The department of frames, cases, and mounts appears to be quite filled up, several illustrations being devoted to the elucidation of this part of the work. What with these, and with chemicals, batteries, colour boxes, posing chairs, and the numerous *etceteras* required in the business or practice of photography, Mr. Atkinson's catalogue is a work of a most comprehensive kind.

The Autotype Manual.—Popular Edition.

London: The Autotype Company.

This Manual differs from all former editions, inasmuch as it is issued at a lower price and in a different size, viz., *octavo*. Notwithstanding its being prepared for "popular" use, we are unable to discover anything, except in external appearance, in which it is inferior to its more elegant-looking predecessors. Mr. J. R. Sawyer, its astute editor, has in this popular edition availed himself of the hints and items of experience of the most advanced carbon printers, which, from his position as director of the Autotype Works, he is so favourably situated for receiving. The work is one which every experimentalist in carbon printing will find it advantageous to study carefully.

Samples of Photographic Chemicals.

London: Burgoyne, Burbidges and Co., Coleman-street.

Among the above samples, one of collodion, although rather too small to enable us to subject it to the test of preparing a few plates by its means, is yet amply sufficient for us to have ascertained its flowing properties and the excellent physical qualities of the film obtained by its means. It is clear and free from structure. Of the other samples, the pyrogallic acid is a fine one. Having tested it in actual practice we can speak confidently of its excellent developing properties. The bichromate of potassium is a vêry fine sample; and of the bichromate of ammonium the same may be said in the most absolute sense.

There are no fewer than five samples of albumenised paper, included among these being the kinds most in everyday use. We observe that these samples are all of a pink tint, from which we infer that there is an increased demand for paper having a tone of a more or less rosy hue.

The reputation of this well-known firm stands too high to render it necessary to speak of the qualities of the goods supplied by them, which, from a perusal of their monthly catalogue, we know to be very varied and extensive.

The University Magazine.

London: Hurst and Blackett.

The portrait of Mr. E. J. Poynter, R.A., from a negative by Messrs. Elliott and Fry, is one which shows better than many we have seen the admirable capabilities of the Woodbury process for book illustration. We had long observed that those negatives which were taken by Messrs. Lock and Whitfield, who have made the requirements of the Woodburytype a special study, gave much finer prints than those by other artists. A few days ago, when in conversation with Mr. Geo. Whitfield, we alluded to this and inquired the cause. It arose, he informed us, from their taking all the negatives intended for Woodburytype purposes in a very soft light, and developing the image in such a manner as not to have great intensity in the details. A negative which prints well on albumenised paper is not necessarily well adapted for Woodburytype. The portrait of Mr. Poynter is much better than many of those which have appeared in the pages of the *University Magazine*, always excepting those by the firm we have just named.

The subject of the portrait in the present number of the *University Magazine* has for a considerable period been recognised as an apt teacher of art. When the professorship of the new schools of art established in connection with University College, in 1870, was offered to Mr. Poynter he accepted it and held the post for six years, after which he received the appointment of Director for Art and Principal of the Government Training Schools at South Kensington.

Among the various articles in the current number of the magazine the *Notes and Reminiscences*, by the late W. H. Harrison, possess an interest for photographers in connection with several reminiscences relating to Sir Frederick Pollock, Lord Chief Baron, and former president of the Photographic Society. The other contents of this popular serial are as varied and excellent as usual.

Light. By Alfred M. Mayer and Charles Barnard.

London: Macmillan and Co.

This forms one of the *Nature Series* of scientific manuals. In it we find a number of easy experiments in the phenomena of light which can be performed with materials that may either be found in every dwelling-house or can be purchased for a small sum in any town.

In order to conduct experiments with light it is necessary that a beam of sunlight be admitted into the room through an aperture in the window shutter. Now, it will be in the recollection of our readers that only a few months since the subject of the *heliostat* was brought prominently before them in these pages. The authors of this treatise (which, we may premise, is a reprint of certain articles that appeared in our contemporary, *Nature)* tell in a few words the whole story of the necessity for a heliostat. We quote as follows:—

"In studying light we do not wish a great quantity. We want only a slender beam, and we must bring it into a dark room, where we can see it and walk about it and examine it on every side, bend it, split it up into several beams, make it pass through glass or water, and do anything else that will illustrate the laws that govern it.

"Choose a bright, sunny day, and go into a room having shutters through which the sun shines. Close the shutters, curtains, and blinds at all the windows save one. At this window draw the curtain down till it nearly closes the window, and then cover this open space with a strip of thick wrapping-paper, cut a hole in this paper about the size of a halfpenny, and at once you will have a slender beam of sunlight entering the hole in the paper and falling on the floor. Close the upper part of the window with a thick shawl or blanket, and when the room is perfectly dark, our slender beam of light will stand out clear, sharp, and bright.

"As soon as we begin to study this beam of light we find two little matters that may give us trouble. The sun does not stand still in the sky, and our beam of light keeps moving. Besides this, the beam is not level and it is not in a convenient place. We want a horizontal beam of light, and some means of keeping it in one place all day. An instrument that will enable us to do this, and that can be adjusted to the position of the sun in the sky at all seasons of the year and every hour of the day, may be readily made and will cost only a small sum of money."

The *brochure* contains several illustrations, and is written in a plain and simple style. The nature of light itself has not been touched upon; this, together with the phenomena of interference and polarisation, is intended to be explained in another book. We may also add that the chemical action of light is not here introduced.

The Psychological Review.

London: E. W. Allen.

For the benefit of a large number of our readers, whom we know to be keen students of psychological phenomena, we may state that the second number of this quarterly more than bears out the high promise of the first. It is ably conducted, and the various articles are of a high class.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 25	Oldham	Hare and Hounds, Yorkshire-st.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

The annual meeting of this Association was held on Monday, the 8th inst.,—The Right Hon. Lord de Ros in the chair.

The minutes of the last meeting having been read and confirmed, the following were elected members:—W. E. Gibb, Esq., F. A. W. Whitmore, Esq., H. T. Simmons, Esq., E. Dubois, Esq., and Mrs. Mansel Lewis.

The Secretary having laid before the Council the pictures for the current year, Mr. Glaisher read his report, of which the following is an abstract:—

Class I. contains 73 pictures, contributed as follows:—R. O. Milne, Esq., 19; T. R. Shervington, Esq., 11; W. S. Hobson, Esq., 8; J. W.

Leigh, Esq., 6; T. Brownrigg, Esq., 5; F. Beasley, Esq., 3; Sir George Prescott, 3; Major Chadwick, 2; Major Allen, 2; Mrs. Gulston, 2; W. H. Kirkby, Esq., 2; W. Vanner, Esq., 2; R. Murray, Esq., 2; Rev. W. H. Palmer, 1; J. C. Stenning, Esq., 1; J. E. Thornburn, Esq., 1; Lieut. S. G. Fairtlough, 1; R. Leventhorpe, Esq., 1; Rev. W. Hancock, 1.

Class II. contains 94 pictures, contributed as follows:—The Right Hon. the Earl of Caithness, 3; the Right Hon. Lord de Ros, 2; R. O. Milne, Esq., 12; Rev. W. Hancock, 8; J. C. Stenning, Esq., 6; J. W. Leigh, Esq., 5; R. Murray, Esq., 5; W. S. Hobson, Esq., 5; F. Beasley, Esq., 4; Rev. H. Palmer, 4; Major Chadwick, 4; Major Allen, 3; P. Gunyon, Esq., 3; W. Vanner, Esq., 3; Mrs. Deeble, 3; R. Leventhorpe, Esq., 3; C. Stephens, Esq., 2; G. W. D. Green, Esq., 2; T. R. Shervington, Esq., 2; Capt. Fox, 2; Mrs. Gulston, 2; J. E. Thornburn, Esq., 2; Lieut. S. G. Fairtlough, 2; T. Brownrigg, Esq., 1; E. Milsom, Esq., 1; W. H. Kirkby, Esq., 1; Miss Coxe, 1; Sir George Prescott, 1; A. Watkins, Esq., 1; H. T. Simmons, Esq., 1.

Class III. contains 100 pictures, contributed as follows:—The Right Hon. Lord de Ros, 2; Rev. W. Hancock, 10; W. Muller, Esq., 8; the Right Hon. the Earl of Caithness, 2; G. W. D. Green, Esq., 6; W. Vanner, Esq., 6; C. Stephens, Esq., 5; E. Milsom, Esq., 5; Rev. H. Palmer, 5; Mrs. Deeble, 4; Mrs. Evans, 4; F. Beasley, Esq., 3; W. S. Hobson, Esq., 3; Major Allen, 3; Capt. Fox, 3; J. C. Stenning, Esq., 3; W. H. Kirkby, Esq., 3; Major Chadwick, 3; G. W. Keeling, Esq., 2; R. O. Milne, Esq., 2; P. Gunyon, Esq., 2; Lieut. S. G. Fairtlough, 2; J. W. Leigh, Esq., 2; R. Murray, Esq., 1; Mrs. Gulston, 5; J. E. Thornburn, Esq., 1; A. Watkins, Esq., 1; H. T. Simmons, Esq., 1.

The remainder of the pictures are comprised in Classes IV., V., and VI.

Mr. Glaisher, after mentioning the assistance rendered by his colleague, Mr. Sopwith, in the classification of the pictures, remarked that the large number of fine 12 × 10 pictures sent by Mr. Milne merited the highest commendation, and called special attention to the numerous beautiful Chinese pictures contributed by Mr. Shervington. Mr. Glaisher then referred to some excellent work forwarded by Mr. Hobson and Mr. Brownrigg, and also to two remarkably soft and well-chosen views by Sir George Prescott, and a most interesting series of views, recalling Cooke's well-known pictures of shipping, by the Rev. W. Hancock.

The following prizes were then awarded:—

First prize, R. O. Milne, Esq., for pictures Nos. 76 and 82—a large silver goblet. *Second prize*, T. R. Shervington, Esq., for Nos. 2 and 10—a silver goblet. R. O. Milne, Esq., for Nos. 70 and 87—an oil painting in gilt frame. J. W. Leigh, Esq., for Nos. 1 and 4—an oil painting in gilt frame. W. S. Hobson, Esq., for Nos. 158 and 159—a graphoscope. Sir George Prescott, for Nos. 1 and 4—a large album elegantly bound in morocco. Rev. W. Hancock, for No. 13—an oil painting in gilt frame. F. Beasley, Esq., for Nos. 277 and 279—an oil painting in gilt frame. T. Brownrigg, Esq., for No. 36—an album elegantly bound in morocco. Major Allen, for Nos. 102 and 103—an oil painting in gilt frame. R. Leventhorpe, Esq., for No. 4—an album elegantly bound in morocco.

Certificates of honourable mention were awarded to Mrs. Gulston, Major Chadwick, W. Vanner, Esq., Lieut. Fairtlough, W. H. Kirkby, Esq., J. C. Stenning, Esq., R. Murray, Esq., and Rev. H. Palmer.

A vote of thanks to the Chairman was proposed by Mr. Glaisher, seconded by Mr. Gooch, and carried unanimously; and a vote of thanks was also passed to the referees, for the time and attention they had given to the arrangement and classification of the pictures. The latter resolution was proposed by Sir Antonio Brady, and seconded by Mr. Howard. A. J. Melhuish, *Hon. Sec.*

Correspondence.

Death of M. Fordos.—Solid Oxgall.—Carbon Printing.—M. Janssen on Solar Photography.

The usual monthly meeting of the Photographic Society of France was held on Friday, the 5th instant,—M. Davanne, President of the Committee, in the chair. The attendance of members was small in consequence of the heat, which rendered outdoor amusements and the cooler breezes on the Terrace de l'Orangerie, overlooking the river Seine, and in the Champs Elysées, irresistibly attractive.

Herr Luckhardt, of Vienna, Secretary of the International Jury of Class 12 (photography), being present, was invited by the Chairman to occupy a place amongst the committee, and also his colleagues of the jury.

On behalf of the President, and of himself, the Vice-President, of the Photographic Society of Vienna, he (Herr Luckhardt) expressed himself as highly flattered by the reception they had received from the Photographic Society of France and all connected with the Exhibition.

Mr. A. L. Henderson, of London, was also introduced to the Chairman.

The Chairman announced the death of M. Fordos, the chemist—a member of the Society, an operator in the days of Daguerre, and who, as the partner of M. Gelis, first introduced the *sel d'or* of Fordos and Gelis for the toning and fixing of silver proofs, and also, for the more permanent toning of prints, the double salt of chloride of gold and potassium. The Society decided that its regrets and condolence should be presented to the family of the late M. Fordos.

M. Lamy sent a communication on a new solid coating of oxgall. He has for some time substituted for the liquid coating of oxgall a solid one, having for its base the fatty acids of gall. This simplifies the preparation of glass plates to serve as supports for the development of carbon paper, and which he prepares in the following manner:—The oxgall of one animal is kept in a covered vessel until completely putrified, which requires from eight to ten days at this season of the year. From the time the oxgall is considered sufficiently decomposed the fatty acids it contains are precipitated by the aid of about 25 c. c. of glacial acetic acid, or of 100 c. c. of ordinary vinegar, which is necessary to separate all the fatty matter contained in a large gall of about 500 c. c. The precipitate is left to deposit itself at the bottom of the vessel, which requires about two days; it is then decanted and the clearest part rejected. The other portion, which still retains the precipitate in suspension, is poured into a funnel, closed with a fine sponge. If there still remain a precipitate adherent to the bottom of the vase it may be removed with a spatula and passed upon the sponge. As soon as all the matter deposited upon the sponge is dry it is washed with water several times and then drained; the sponge should be pressed a little to remove the last portion of the water. When this fatty deposit is well drained it is separated from the sponge and is pounded, together with an equal volume of melted grease. Up to the present time he has only used melted beef grease and fresh butter. To preserve this mixture without deterioration it is necessary to add a gramme of powdered alum to each hundred grammes of grease and remelt the same. Thus is obtained a sort of pomade insoluble in boiling water, which is very slightly applied upon a pledget covered with flannel or wash leather and rubbed over the glass plates, which should have been previously cleaned. The marks of the pledget must not be visible, so that the final image may not bear any traces of it. The plates thus prepared may be used immediately or kept a long time for future use. The exposed carbon paper is attached to these plates in the ordinary way, either in a tray of clean water or upon a pool of water upon the plates laid horizontally on levelling screws. The development of the image and drying, with the application of the transfer paper, is conducted as usual, and the image upon the transfer paper separates from the glass plates with the greatest facility and having all the brilliancy and lustre of the glass surface without the necessity of using collodion.

The preparation of this pomade is tedious, but when once obtained the employment of it is most easy and rapid, and gives results which may be depended upon as constantly good. Its advantages over the liquid coating described by M. Lamy some time ago in The British Journal of Photography are very great. A simple coating of the glass plate suffices; besides, there is no need to attend to the desiccation, nor is it necessary to render insoluble the dried coating on the glass. Any number of plates may be prepared in advance for future use, and in this case, although the coating is dry, it becomes instantly moist and adhesive when it is wetted. The fatty acids of the gall seem to be chemically combined with the grease, because the film does not repel water; on the contrary, it absorbs it.

M. E. Lamy offered the following remarks on the subject of the employment of the precipitation of oxgall unmixed with grease:—Glass plates cannot be easily coated with the pure precipitate of oxgall alone; for in rubbing the glass surface with the pledget the coating becomes at first sticky, then dries quickly, and presents a powdery surface. Notwithstanding, if with a little trouble a plate has, however, been uniformly covered, it will be seen that the carbon paper, when softened and applied under water as usual, adheres so very strongly that, finally, when dry, it cannot be detached therefrom. This strong adhesion may be utilised to produce the proofs destined to remain on glass; but for this purpose it is advantageous to add to the precipitate of gall a product which renders easy the coating of glass plates without diminishing the adhesion after desiccation.

M. Liebert said that the product of M. Lamy took long to prepare, and having much experience with the carbon process he saw no necessity to change his way of preparing the surfaces of the plates for the temporary support during development. He had used for years benzole, to a litre of which he added ten grammes of the common wax that everybody used for waxing the boards of their oak floors.

M. Davanne, in paying a compliment to M. Liebert for his labours, said he must leave M. Lamy to fully reply to his objections, and proposed that the thanks of the Society be presented to that gentleman for his communication.

The reading of the article, by Mr. Henry Cooper, in the British Journal of Photography (page 266), *On a New Substratum*, elicited the remark from M. Davanne that in France talc answered every purpose; it was especially valuable when the collodion image had to be removed, in proof of which he mentioned the valuable reproductions from the MS. in the Hôpital de Meaux, which had been removed from the glass, to serve the purposes of photolithography, by M. Berthaud.

M. Michaud recommended the addition of one-tenth per cent. of chrome alum to the gelatine before pouring it on the collodion image, which rendered the film when detached from the plate more flat and capable of resisting moisture and damp.

M. AUDRA's experience was conclusively in favour of talc, whether for retaining the film of collodion and emulsion on the plate during development or enabling the same to be surely and effectually transferred therefrom with gelatine.

M. Vidal presented to the Society his new work and views of the Universal Exhibition, the plates of which were printed from gelatine images (phototype), and printed by machinery at the rate of one thousand proofs in nine hours' press-work, giving white margins to each, and thus saving the time and expense of mounting on cardboard. The printing, without finished margins, could be executed at the rate of 15,000 per day of the same number of hours. M. Vidal, for some of his views in the Avenue des Nations, complained that there was not sufficient receding space for his French lens.

M. Michaud also made a presentation to the Society of some of his photo-engraved proofs, absolutely untouched, and printed by M. Chardon, one of the first printers in Paris.

M. le Commandant de la Noë showed some new proofs by the orohe-liograph—a camera perfected by Colonel Mangin, which now gives by means of prisms the circular images of the horizon. The former support of the mirror being superseded, there is no longer any want of continuity in the proofs of the whole circular horizon, as in the original instrument, the fundamental principles of which are still under study; further progress is at present in train, and will in due time be communicated through the kindness of Commandant de la Noë.

M. Raoult, of Odessa, forwarded a numerous colleetion of pictures of the people and costumes in the various governments of Russia, and which were of a most interesting character, being also very good specimens of photography.

M. Chauvigné, of Tours, exhibited some perfect proofs in carbon of groups of flowers; these were of great excellence, both as to artistic composition and technical execution.

M. Rothschild, publisher, stated that he employed photographic impressions in printing ink very extensively for the illustration of his publications, and had utilised the services, since 1872, of M. Tessie de Mothay, M. de Gayfier, M. Thiel, M. Meynier, and M. Berthaud. He had for some time given a preference to the excellent mechanical prints executed by the Autotype Company of London, specimens of which he presented to the Society.

The chief interest of the evening centred in the communication of the distinguished *savant*, M. J. Janssen, Member of the Institute of France, Director of the National Observatory of Physical Astronomy of Paris, at Meudon, &c., whose simplicity of manners added grace to his learning, whilst the numerous diagrams he drew on the black board illustrated his ideas and rendered easy the comprehension of the subject. I here personally take the opportunity of thanking M. Janssen for his extreme kindness and courteous attention to myself. To him the numerous readers of THE BRITISH JOURNAL OF PHOTOGRAPHY are indebted for the following remarks:—

M. JANSSEN brought before the Society the continuation of his researches upon solar photography. It is already known how the author has been led to obtain photographic proofs which reveal to us details before unknown as to the constitution of the solar surface. Up to the present time no one has been able to reproduce photographs of the sun containing anything beyond the great and strongly-marked features of the surface of that heavenly body, and more especially the spots *(taches)*. At various times details having relation to its surface granulation have been obtained, but in a slight and very uncertain manner, and which did not permit of any serious and continued study. Now, the solar photographs obtained at the observatory of Meudon show a disc of about $19\frac{5}{8}$ inches in diameter, and giving details of the constitution of the photosphere totally unknown before—notably on the nature of the granulations. Thus, a new method is opened out for the study of the solar orb. It is principally in shortening the luminous action to an extremely short duration of time—about $\frac{1}{3000}$th of a second—and in afterwards enlarging the images, that M. Janssen has been able to obtain this result. It is well understood, however, that the perfection of the photographic process itself is here indispensable in order to obtain the images of great purity. From the commencement these important labours have conducted the learned author to study the constitution of the photographic spectra, when the time of the luminous action is thus reduced to such short exposures. M. Janssen has found that under these conditions the constitution of the spectrum changes considerably, and recently he has studied the constitution of the photographie spectrum with various collodions, having for a base the principal iodides and bromides, employed separately or in combination. Details will be afterwards given upon these results on the spectrum; but the fact to bring into evidence or light is this—the extent to which the photographic spectram diminishes with the time of exposure, and with the duration of some seconds or fractions of seconds, as the case may be, the spectrum is reduced to a band situated very near the line G of the spectrum of Fraunhofer. M. Janssen placed before the members of the Society the spectra of several substances obtained with exposures successively shortened, and where was seen in effect that the length of the spectrum diminished rapidly. This remarkable circumstance showed all the advantages that photographic images could have under these conditions, from the point of view of sharpness, over ocular images. It explains, in a great measure, how the shortened exposures have permitted M. Janssen to obtain and secure solar images more perfect than the ocular images of astronomical telescopes. On this subject M. Janssen desired to state that these experiments have been made with the photographic telescope, of five inches aperture, that M. Prazmowski had constructed in 1874, at his request, for his expedition to Japan. In the construction of this instrument—independently of the optical principles which belong to M. Prazmowski—this eminent optician had taken into account the above remarkable spectral circumstance which M. Janssen had already observed. He (M. Janssen) gave, in continuation, some details in connection with the instrument which, in the photographic telescope, enabled him to reduce the exposure to so small a fraction of a second. This apparatus is formed essentially of a brass plate having a slit of variable opening, this plate being carried by another larger plate, upon which it moves between small wheels. The movement is obtained by spiral springs, *à boudin*, of which the arrangement is such that to produce the exposure they have no further action when the slit passes before the solar image. It is in virtue of the acquired speed that the plate with the slit then moves, and the result is an uniform movement. This apparatus of exposure is placed at the focus of the lens, and at the exact place where the real image is formed. To measure the time of the exposure a pendulum is used, the duration of whose vibrations are known. The vibratory movement is inscribed by a pointed tool upon the plate carrying the slit, allowing of the measurement of its speed, and, in consequence, the appreciation of the duration of the time of exposure according to the degree of the opening of the slit. In these experiments the duration of the action of the light is *en rapport* with that of the direct light of the sun. In summer the solar photographs are obtained by exposures which may vary between $\frac{1}{2000}$th and $\frac{1}{3000}$th part of a second of time. This short exposure is a circumstance of the greatest importance in securing the details of the surface of the sun.

The thanks of the Society were voted by acclamation to M. J. Janssen with great enthusiasm. W. HARRISON.

Asnières (Seine), Paris.

INTENSIFYING GELATINE NEGATIVES.

To the EDITORS.

GENTLEMEN,—Will you kindly inform me of the best means of intensifying gelatine negatives? I have been experimenting with gelatine emulsion made according to Mr. C. Bennett's formula, published in your Journal some little time ago, and have succeeded in obtaining very rapid plates by it, but have failed to get sufficient intensity; in fact, the images produced are so faint that after the plates are fixed they are scarcely discernible, and on attempting to intensify them by the ordinary acid pyro. and silver method the films blister all over and become spoiled completely.

I have modified the developer, using it weak and also strong, and I have also added a small dose of bromide of potassium to prevent it from acting too quickly and to allow it more time to penetrate the film; but still the images are not intense enough for printing.

I have also tried the ferrous oxalate developer, but with no better result. This developer I like very much when freshly made; but I find that it will not keep good long, as it gradually loses its developing power.

I may state that I thoroughly washed the plates between the development and the intensification.—I am, yours, &c., A. J. REILY.

Weston-road, Handsworth, Birmingham,
July 16, 1878.

[We print this letter *in extenso*, because we have heard of others also who, when making use of plates prepared by Mr. Bennett's formulæ, have not got the degree of intensity they wished. In our own practice we have always obtained intensity by first fixing, and then applying pyrogallic acid with citric acid and nitrate of silver. By making use of *hard* water the film will not be disturbed. We shall be glad to learn the experience of others on this subject.—EDS.]

EXTRA SENSITIVENESS OF DRY PLATES.

To the EDITORS.

GENTLEMEN,—Premising that I am an old experimentalist in dry-plate work—as my card enclosed will certify—permit me a few remarks on the subject of your article on sensitiveness in last week's Journal.

Seeing that it is quite impossible to time the exposure of dry plates with absolute accuracy, unless one carries to the field with him a tent by which he will be enabled to ascertain, from the actual development of a plate occasionally, whether he is not under- or over-exposing, the next best thing to do is to adopt a method of developing which shall be tentative to such a degree as to indicate at an early stage of development whether the exposure has been correctly timed, and, if not correct, the remedial measures to be adopted.

Having tried every method of development that has yet been published, the only one which in my experience fulfils the above conditions is that in which the development is commenced with the application of a plain aqueous solution of pyrogallic acid, having such a faintly alkaline reaction as to bring out the feeble traces of an image after it has been acting upon the film for about a minute. A trained eye will be enabled to decide from the appearance of this feeble image whether or not the exposure has been correct; and the subsequent application of a soluble bromide (I make use of bromide of potassium) will prove an equalising agent in case of the correct exposure not having been hit.

To such an extent is this the case that you, Messrs. Editors, will bear me out when I say that a plate to which I gave more than twice the exposure it ought to have received was, by a copious libation of bromide of potassium at the early stage of its development, made to yield a negative quite equal, in respect both of quality and apparent time of exposure, to one exposed for only half the time it received.

I quite agree with you, however, that for the generality of landscape purposes extreme sensitiveness is *not* desirable.—I am, yours, &c.,

Camberwell, July 15, 1878. AJAX.

EXCHANGE COLUMN.

I will exchange my Woodward's solar camera for a good 10 × 8 camera and lens.—Address, A. B., 91, Eastgate, Rochester, Kent.

Wanted to exchange, carpenters' tools (new) for a good dark tent on wheels, to work 12 × 10, or a 12 × 10 Kinnear camera with sliding front.—Address, J. MERRY, High-street, Glossop.

I will exchange three gross of quarter-plate glass, new and perfect (worth 7s. 6d. per gross), for printing-frames or anything useful in photographic goods.—Address, J. W., 5, Keith-terrace, High-road, Lee, London, S.E.

I will exchange a 15 × 12 mahogany bellows camera with double swing back and screw for focussing, with watertight glass bath in mahogany case and plate-box, for a similar set for 12 × 10.—Address, G. HADLEY, 33, Newland, Lincoln.

Wanted, a good portable whole-plate tent, complete, in exchange for value from the following:—Half-plate portrait and view lens, half-plate light bellows camera (three fronts and folding tailboard), strong folding tripod-stand, umbrella-stand, half-plate box tent with tripod, tray, cistern, &c., complete, Howard tent. All the foregoing are in good condition.—Address, F. MOTTERSHAW, 2, Talbot Gardens, Sheffield.

ANSWERS TO CORRESPONDENTS.

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

NOTICE.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

J. J. H.—This correspondent wishes to know the address of M. Steinbach, the continental paper-maker.

T. SADDLER.—It is quite easy to understand: the *principal* focus of a lens is the point to which parallel rays are made to converge.

W. R. HARRISON.—Our Paris correspondent's communication received just before going to press. Will appear in our next number.

F. S. GRAY.—Your scheme is scarcely feasible. It is based on the supposition that the light is uniform in strength, which, unfortunately, is not the case.

P. P., PHOTO.—Use the lens without a stop when taking vignettes. For other portraits let the diaphragm be the largest possible consistent with marginal sharpness.

G. W. GREEN.—We have forwarded your letter to the gentleman named, who will, no doubt, reply to it. We imagine that the publication of the work is only being delayed, not given up altogether. Such a work will be gladly welcomed by many, ourselves included.

GEORGE.—The method of producing vitrified enamels by toning a transparency by means of chloride of platinum and then burning it in is at least as old as 1865, in which year we published it. After this information it rests with yourself whether you will proceed with the proposed patent.

B. WALLIS.—Like many other inventions the graphogenic apparatus did not fulfil the promise it once held out, and so it was discarded. We believe it would now be impossible for you to obtain such a piece of apparatus; but there is no harm in making application at the establishments of the various dealers in second-hand appliances.

OBLIGED READER.—One ounce of sandarac to six ounces of shellac will prove to be a very good proportion. Place a quantity of broken glass, or small pebbles well washed previously, in the bottle of alcohol along with the resins, and then place the bottle in an oven where it will be retained at a warm temperature. Shake it at frequent intervals for half-an-hour, after which the varnish will be made. We assume that a quart of spirits of wine (methylated spirits will answer) has been used. It must now be allowed to stand undisturbed for eight or ten days, by which time a mass of white insoluble matter will have been deposited. When filtered the varnish is ready for use. Common filtering-paper may be employed.

JOHN F. STEVENS.—Your friend has been indulging in a quiet bit of fun at your expense. To "crystallise carbon" is simply to make diamonds; and to raise the temperature of "protoxide of hydrogen" to 100 C. is merely to boil plain water, which, of course, is *not* a solvent for the crystallised carbon.

S. Y. B.—Make a weak solution of cyanide of potassium—about four or five grains to the ounce will be strong enough—and pour it, drop by drop, into the silver solution until a permanent milkiness is formed; then filter, and the solution will be ready for use. In reply to the postcript of your letter: we make it a special rule never to recommend the productions of either opticians or camera-makers. This applies also to collodion and other chemicals. Wherever we think there is a necessity for it we, however, freely intimate where certain rare articles are to be obtained.

T. O. B.—has broken off the lower end of his ebonite dipper, and has been trying to repair it by means of marine glue, which has not proved successful. He wants to know by what means the mishap may be remedied.——He must avoid entirely making use of glue or any other kind of cement, and effect the repair by drilling holes in the ebonite and attaching the broken piece by means of silver pins or rivets. If unable to do so himself, let him take it to a working jeweller and instruct him to mend it in the same way as he would a lady's tortoiseshell comb, making use of silver for the purpose.

ONE IN TROUBLE.—It would be quite impossible for us to explain the cause of the long exposures required unless we paid a visit to your studio. It may arise from the colour of the glass having changed or from the erection of some building in the vicinity. On the other hand, it may be owing to the use of unsuitable chemicals, or of a lens which, having been too much exposed to light, has changed colour, and thus become slower. We would not for a moment hint that you may have less experience in manipulating than your predecessor; but would suggest that you secure the professional services of any experienced photographer who is willing to devote a day to the examination, and thus ascertain the cause of what will sooner or later prove a serious drawback to your success.

MEDICUS.—It is not easy to indicate in an off-hand way the amount of nitrate of silver required to sensitise a sheet of albumenised paper, because the proportion of salting material in the albumen varies according to the tastes of the respective makers. Suppose, however, that the albumen contains ten grains of chloride of ammonium per ounce—a proportion which we believe is extensively adopted—it is found that about six and a-half drachms of albumen is taken up by each sheet. This represents a little over eight grains of chloride of ammonium in each sheet, which quantity nearly equals twenty-six grains of nitrate of silver. But the albumen, in addition, takes up a certain quantity of the silver, which may be estimated at four grains more; hence it is practically correct that to excite each sheet of albumenised paper requires thirty grains of nitrate of silver.

"CHLORIDE OF PLATINUM."—A correspondent, who adopts this *nom de plume*, has been trying to tone gelatine transparencies by means of chloride of platinum, but without success. Had his query related to *collodion* transparencies we could have spoken with freedom, having had some experience with this application. As our experience has not extended to gelatine, we reproduce his note in the hope of its eliciting a reply:—"Will you state in the column of 'Answers to Correspondents,' in the earliest number of the Journal possible, how chloride of platinum is to be used for toning lantern slides so as to produce a dense black tone. I have tried the plain solution of various dilutions, but cannot change the colour of the image in the slightest degree. The plates used are *gelatine*, and developed by the alkaline method. I have looked through the last three volumes of the Journal and the last three ALMANACS, but can find no reference to this method of toning."

THOMAS.—This correspondent makes inquiry as follows:—"1. Does Mr. Edwards use any special developer with plates sensitised in the nitrate bath, particulars for making which he gave in a paper read before one of the London societies over a year ago? If so, please give formulæ.—2. What is the cause of a silvery scum appearing almost immediately after pouring on the developer, and at the same time a gradual darkening of the image? I have tried shorter exposures, but the same thing occurs, only that it is not so quick in appearing. I may say the bath has only been lately mixed, as given by Mr. Edwards, and there has not been more than twenty plates sensitised in it (size of bath, quarter-plate). I have used two different developers—one an ordinary iron developer, and the other containing acetate of soda, as given in the pages of the ALMANAC.—3. Please state what other substances or liquids (besides the following) have been used or are capable of preventing the slipping of emulsion films, viz., india-rubber in benzole, albumen, gelatine, cocoa butter, and gelatine rendered insoluble by chrome alum."——In reply: 1. Mr. Edwards recommends a developer composed as follows:—

Protosulphate of iron	1 pound.
Ammonia-sulphate of iron	1 ,,
Sulphate of copper	1 ounce.

Water to make a saturated solution. To use this add *about* thirty drops of it to an ounce of water, to which must also be added about half-a-drachm of glacial acetic acid and a like proportion of alcohol. The proportions may, however, be greatly varied to suit the nature of the work.—2. The silvery scum indicates the presence of organic matter in the bath.—3. Rub the plate with French chalk. This will effectually answer the purpose of a substratum.

RECEIVED.—E. Eccles; X. Y. Z.; J. G. B.; and Geo. B. Sutcliffe.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 951. Vol. XXV.—JULY 26, 1878.

THE NITRIC ACID PROCESS FOR PRODUCING REVERSED NEGATIVES.

Some time ago we were called upon to assist a friend in the reproduction of a number of transparencies which were required for a special purpose, and the negatives of which, if indeed in existence, were not immediately accessible. The originals were of the stereoscopic class, whilst the reproductions were required for lantern purposes, and the method adopted consisted in the double operation of printing, by superposition, first a negative, and from it the duplicate transparency. Those who have had any experience in this direction will be aware of the difficulty which attends the "translation" (if we may so term it) of the deep, heavy shadows of an ordinary stereo. transparency into the clear, juicy details requisite in a lantern slide. By the method we adopted this difficulty was brought into even greater prominence, but, unfortunately, it was at the time we speak of the only plan available.

Now, however, there exist at least two processes by which the required end may be attained in a single operation, and, perhaps, in better style than by the old plan; for we must confess that we do not look back upon the results of our labour on that occasion with complete satisfaction. Had we the same task set us again our choice of means would rest between one of the "dusting-on" methods and the negative reversing process with nitric acid, which have only within the last few years acquired any popularity in this country. The "dusting-on" process would, no doubt, carry the palm provided the exposures could be made by daylight, offering, as it does, so many facilities for modifying the character of reproduction and for improving faulty portions of the original. It has its disadvantages, however, especially in the hands of those not thoroughly conversant with its action, and, unless habitually worked, is liable to give irregular results from slight variation in the state of the atmosphere. For transparency work, too, the image is, perhaps, not of the best quality for the purpose, though we have seen "dusted-on" transparencies as fine in grain as the best developed ones.

The nitric acid reversing process, on the other hand, commends itself on the ground of its universal application. It may be used by daylight or by gaslight, and the exposures may be made either in the camera or by superposition, while a further advantage is found in the fact that it introduces no unaccustomed manipulations, unless it be the removal of the image by nitric acid. This process has been successfully applied to the production of transparencies direct in the camera for enlarging purposes, and has deservedly attained a high degree of popularity. It has also been used for the reproduction of negatives; but in this class of work, for some reason or other, it does not appear to have produced so favourable an impression, though, as far as we can see, there is no real reason for the difference. A *practical* reason does, no doubt, exist in the extra amount of skill necessary in the reproduction of a negative where the operator works to a certain extent in the dark, and much is left to his judgment. Still, we repeat, there is no real reason why one operation should be more difficult than the other, if only an equal amount of study be given to the special requirements in either case.

Though, as regards the facilities afforded by the nitric acid process for the alteration or improvement of the character of the negative, it is, from the nature of the operation, inferior to the "dusting-on" method, it is still possible to produce duplicates fully equal to the original, and in certain cases an actual improvement may be effected. As is well known, one of the special features of the latter plan is the power it gives of working upon portions of the picture which may be defective without altering those parts which do not require such treatment; and it is in the absence of this power of local application, in the case of the nitric acid process, that the difference in their application consists. We cannot, for instance, bring into greater prominence the feeble detail in an under-exposed shadow without, at the same time, producing a corresponding effect upon the remaining portions of the picture; in other words, if we attempt to strengthen the feeble portions of the positive image by pushing the development the reducing action is carried on to a proportionate extent over the whole plate, and the result is that, after treatment with nitric acid, the under-exposed portions of the original are rendered even more transparent and devoid of detail. If, on the other hand, the development be arrested at such a point as to prevent over-reduction in the shadows, the high-lights and half-tones of the reproduction are rendered too dense.

These, indeed, are the two extremes which have to be guarded against, and which constitute the chief difficulty in the successful working of the process. The great mistake is made in trusting too much, if not entirely, to the development to produce the desired effect, when in reality the whole matter hinges principally upon the exposure. We know that in developing a negative in the ordinary way we may by modifying the development produce images of very different apparent density irrespective of the actual amount of silver reduced. Thus, rapid development with a full dose of ammonia will give an image in which the bromide is reduced through nearly the whole thickness of the film, whereas a slow and gradual action produces a denser-*looking* image, though a thinner layer of bromide may have been acted upon. The appearance after treatment with nitric acid of two such films would plainly be very different. The secret of success lies in the careful adjustment of the exposure to a fixed strength of developer, and the total relinquishment of all attempts to modify the result by fresh additions of ammonia or bromide.

There is no greater difficulty in thus regulating the exposure than is experienced by the wet-plate photographer who works with a developer of uniform strength. It results simply in the reduction of alkaline development for this purpose, at least, to an unvarying standard to which the exposure should be adjusted, so as to produce the required effect at one operation without subsequent intensification—a matter which does not require a great amount of practice in its attainment. There will, no doubt, be a few failures at first, but where is the process in which such do not occur?

In fixing the strength of the developer we have to consider the practical requirements of the case, and though it is not possible to give a formula equally suitable under all circumstances, we may indicate the conditions to be observed. We have spoken of using a developer of unvarying strength, and we employ the term as meaning its reducing power, *i.e.*, the quantity of pyro. and alkali it contains. The addition of soluble bromide retards, but does not destroy, the developing power, and, as its retarding action is greater upon the more feebly-impressed portions of the image, its use in slightly-varied quantities enables us to modify the exposure to suit different classes of negatives. A certain quantity of pyro. and of ammonia are necessary to the reduction of a given weight of silver bromide; hence we start with a solution containing sufficient of those ingredients to reduce the film, if necessary, through its whole thickness, and, in order to render the operation manageable, and to prevent the slightest suspicion of fog, we add a due proportion of bromide.

The normal developer we have been in the habit of using consists of a three-grain solution of pyro., to each half-ounce of which we add eight drops each of twenty-grain solution of bromide of potassium and of dilute ammonia (one to eight). This is strong enough to produce at one operation the requisite reduction, and the quantity of bromide renders the action sufficiently regular to enable us to stop it as soon as the desired amount of detail makes its appearance. Supposing the plate to have been timed correctly, the action of the solution is continued until the positive picture appears in its correct gradations as regards the finer tints, when upon treatment with nitric acid the deepest shadows should appear as *nearly* bare glass. If the shadows are perfectly transparent, or, on the other hand, present a considerable thickness of unchanged bromide, the exposure has been ill-timed, and the only plan is to try again, reducing or increasing the time according to the result obtained. In this manner, with a little practice, it will be tolerably easy to test the exposure every time; whereas by following the ordinary method of progressive development success is at best but chance work. Fog is to be carefully avoided, as it means a general lowering of the tone of the whole picture; but it is by no means advisable to keep the plate *too* clean—that is to say, presenting too much unchanged bromide, as that leads to hardness in the final negative. It should be remembered that only the very highest lights should remain unchanged in the positive.

The ferrous oxalate developer seems to be peculiarly suited to this purpose, differing, as it does, in its action from alkaline pyro. It is also remarkably free from liability to fog, and, if used in a sufficiently dilute state and in a dish or dipping bath, is very regular in its action. We cannot, however, as yet say that it is preferable to alkali, but many will, no doubt, prefer its greater simplicity.

The redevelopment of the picture after treatment with the nitric acid scarcely requires any remark from us here. We must, however, state that even in this part of the operation the character of the negative may be modified in a variety of ways. The picture may be made thin or dense, flat or harsh, according to the treatment it undergoes after "clearing." Thus, if exposed after merely washing off the acid it will redevelope into a thin, flat negative; if treated with very weak alkali greater strength is obtained, and a wash of tannin gives still greater vigour. The best result, however, is obtained, we think, by flooding it with a ten-grain solution of silver before exposure, and washing again thoroughly before development. The mode of development, too, exercises an important influence on the result; but in all these matters experience alone is to be depended upon for the production of the best work. Finally: we may remind our readers that under no circumstances should silver intensification be resorted to either in the first or second stage of the operation. In the first stage it is simply useless, as the silver laid on to the image is removed by the nitric acid without leaving any effect behind. In the second stage it will develope a positive image in place of the one removed by the acid, and thus produce an even deposit of silver over the whole plate, consisting of a positive and negative image superimposed.

EXPOSING BY ELECTRICITY.

One evening recently, when visiting the studio of Messrs. Hills and Saunders, Porchester-terrace, Bayswater, we were shown by Mr. Cowan, the manager for that firm, the working of an electric shutter for a camera for which a patent has been lately obtained.

The exposure of the plate is effected by slightly pressing a button at the end of a knob which forms the termination of a silken cord covering a wire connected with a galvanic battery. There is nothing to indicate to the sitter that he or she is being photographed, because the cap is so constructed as to cover the posterior end of the lens, which, being inside the camera, is not seen from the outside. As a consequence of this the nervous feeling that frequently affects a sitter at the moment of uncapping the lens is not here elicited, owing to the happy state of ignorance in which the sitter is kept as to the advent of the "inevitable moment."

In order to avoid the slight jar that might be given to a light camera by the too sudden elevation of a flap cap, the cap of the newly-patented arrangement is differently constructed. It forms, as it were, a rotating cap working in a circle, the axis of its rotation being at one side of the lens. It is attached to mechanism placed inside the camera, and is, therefore, unconnected with the lens. By means of a small electro-magnet, controlled by mechanism of which the details will be given when we publish the specification of the patent, the cap is acted upon by the slightest touch upon the button at the end of the exposing cord, the result of the action being the rotation of the cap upon the axis to which it is affixed and the consequent opening of the lens. So long as the finger is kept pressed upon the button the lens remains open; but upon releasing the button the circuit of the galvanic current is interrupted, and the electro-magnet then ceasing to act the shutter is instantly closed by a small spring, the action of which is suspended by the greater power of the electro-magnet.

In a working model shown to us subsequently by Mr. D. H. Cussons—who, with Mr. Cowan, is "interested" in the patent of this invention—the battery (a small "constant" one) was placed inside the camera, so close to the front as not to impede the full transmission of light by the lens. This method will certainly answer quite well—indeed, it *does* answer, as we had ample opportunity of ascertaining when examining the model; but for real efficiency we greatly prefer the arrangement now and for some time in use in the studio of Messrs. Hills and Saunders. It consists in having a constant battery which, in this instance, is placed in the garden, wires from which are brought into the studio and connected with two others that run from end to end of the studio, and are situated at a considerable distance above the camera. One of these wires is connected with the positive pole of the battery and the other with the negative pole. In order to put the camera into circuit with the battery it is only necessary to lay hold of a silk-covered pair of wires which are separated towards the end, the bifurcated branches terminating in hooks which are thrown over the wires that run overhead. No matter how much the camera may be moved to and fro in making the adjustments of the sitter the wires accommodate themselves to any required range of motion, and the continuity of the electric current is always preserved. By means of an elegant silk cord, which disguises the presence of a pair of fine wires inside, the current of electricity is conducted to a knob at its end, and it is by the pressure of a button at the end of this knob that the exposing operations inside the camera are controlled.

It is only a few weeks since we described an ingenious method of capping and uncapping a lens by pneumatic agency. The advantages of the operator being able to uncap the lens when standing at a distance from it are so very obvious that we at first, and naturally, assumed that the electric idea had been suggested by the pneumatic shutter. We were assured, however, that for a period of several months the idea of applying electric force to the exposing of the plate had not merely been in existence but has been actually applied from the commencement of the present year. Up to a very recent period it has been undergoing such a course of experiment that it is only quite lately it could be said of it that it had been perfected.

The action is prompt, and there is no jarring of the camera produced. As there is nothing visible to denote when the exposure is made the closing of the cap is indicated by a slight click audible to the operator, who is thus enabled to intimate that all is over.

BLISTERS IN ALBUMENISED PAPER.

In the whole range of silver printing we doubt if there is any one trouble more annoying and difficult to get rid of, when once it makes its appearance, than the formation of blisters in the process of fixing, or washing after fixing, in the course of printing upon albumenised paper. Yet, paradoxical as it may appear, there are many to whom the very sight of a blister would be an actual novelty; and no one need be surprised that such photographers, when they read or hear of these most annoying appearances, set the cause of their production down to carelessness, bad chemicals, &c. Yet any such opinion would be entirely wrong. Blistering has appeared under the manipulation of the most able printers and of the cleverest operators, and for a long while there was no remedy to be found. Their cause was at first put down to the weather being too hot or too cold, the silver bath being too acid or not acid enough, the toning bath being too weak or too strong, and to a multitude of the most opposite causes; and, as the disappearance of the trouble was frequently coincident with an alteration in one of these directions, it was not unreasonably supposed that the cause was found until, possibly on some very distant occasion, the blisters made their appearance once more.

It is, however, now satisfactorily settled that it is not in any of the causes specified that we must seek for the origin of the evil, though they may modify it in some degree, but to the albumenised paper itself. Some samples may be used for years and not show a blister, while others cannot be used without almost every batch of prints being more or less injured. The annoyance is increased by the fact that it is usually the brighter and more brilliant pictures that suffer most; and this points to the now well-known fact that it is the more highly-glazed paper that is most liable to blister.

Some of our readers may say—"What matters the blisters, seeing they dry down and do not show?" To this we reply that, in the first place, the washing in the blistered part is uneven, and that there is every probability that the hyposulphite with the silver dissolved—that is, the double hyposulphite—will be found to decompose in them and most likely form a deposit which, in course of time, would lead to fading and spottiness. That the blisters may not show for some time after drying down ought not to be sufficient for any photographer of integrity; he ought to feel reasonably certain that they will not show ultimately in his prints, or he ought to reject them. And that there is every probability of their ultimately changing is proved by the fact that when the blistered prints are washed for from twelve to wenty hours there will be a marked difference between their colour when dried down and that of the surrounding parts. If further confirmation were wanted of the actual difference that exists between the two portions—that is, the blistered and the unblistered—we would suggest to our readers that they try a picture that has been blistered and dried down without leaving a stain by passing it through a hot press or a burnisher. They will then see a most startling change—such a difference as might be expected to show sooner or later in the finished picture.

The injurious nature of blisters being taken as proved, it becomes a matter of moment to find a cure for them; for, though some photographers never experience them, there are many who do, and no one can tell how soon he may have a sample of paper that will break out in this least-desired manner.

A host of panaceas have been invented, and a number of theories offered, to explain the cause of the phenomenon fully. The favourite theory is that the separation of the film of albumen from the paper is caused by the ozmotic force exercised between the two liquids—the strong solution of hypo. and the plain water—separating the film in the parts where there is least adhesion to the paper support; and many practical remedies have been suggested founded on that theory. We have a number of experiments on hand in which we are endeavouring to find the true origin of the fault, and the best remedy and prevention, if possible.

It might be imagined, *à priori*, that if the blisters were caused by this action, and not by the products of the special chemical reaction between the hypo. and the chlorides of silver and the albumen, the immersion of a washed print in a solution of any other salt would also produce blisters; but it must be borne in mind that there is a vast difference in the ozmotic action of various salts, and for the experiments to be parallel the other solution must be of a salt whose power in this respect is on a par with that of the hypo. Thus, a dilute solution of chloride of sodium has been recommended as a medium in which to immerse the prints, to halve, as it were, this action, and so prevent the formation of blisters. But we have tried it more than once, and have not been able to find the slightest benefit from its employment. It is certain that, even if the practice were correct here, it would be a right conclusion from wrong premisses; for, as we have before stated, blisters should be able to be produced by a salt which could act as a remedy in this manner. But if anyone immerse a print in a solution of salt of considerably greater specific gravity than the usual solution of hypo., he will fail to obtain a trace of a blister.

To give some idea of the force of osmose of various salts we pick out two extremes. Chloride of sodium is represented by 2, and chloride of aluminium by 540, in a table showing the osmose of substances through membrane, the degree being a rise or fall of one millimetre.

We close the subject for the present by publishing the experience of one of our contributors. Mr. G. Watmough Webster informs us that, having a sample of paper that blistered to an extraordinary degree, he has after a number of experiments found that the blisters were entirely cured by the addition to the hypo. solution of twenty per cent. of methylated spirit. A smaller quantity would not answer at all with this particular sample.

RECENT PATENTS.

No. XI.—PRODUCTION OF PHOTOGRAPHIC PICTURES ON WOVEN FABRICS.

The following application of photography to textile fabrics is by Mr. William Winter, of Prague, Austria:—

The object of this invention is to produce magnified positive photographs on woven fabrics, such as linen, cotton, silk, or wool, and with the use of iodide or chromide of silver.

The process consists essentially in impregnating the woven fabric with iodide or chromide of silver, and thereby making it so sensitive to light that from a negative plate of about eight square inches a magnified positive photograph of up to more than forty square feet may be produced on the said woven fabric.

When electric light is employed the positive photograph may be produced in from one to four minutes.

The iodides and chromides are in general use for producing negatives, but hardly at all for negatives; and, although many attempts have been made to utilise the sensibility of these salts for the purpose of rapidly producing magnified photographs on paper, these experiments have nearly always remained futile.

The proportions of the chemicals to be used vary, not only according to temperature but also according to the density and material of the woven fabric, so that in the case of lower temperatures and denser woven fabrics, which do not so easily absorb fluids, the solutions must be made stronger, and iodides must be used in preference to chromides.

By way of example there shall now be described the proportions that may be used at a temperature of from twenty to twenty-three degrees Centigrade, and with linen or cotton fabrics of average density and fineness. This description will serve as a measure for the possible variations under the previously-mentioned circumstances.

The woven fabrics must be first freed from all chemical impurities, and the subsequent operations may then follow in the manner now to be described.

1. *The Treatment with Chromides.*—The woven fabric is passed through a solution composed of four parts by weight of chromide of potassium, one part of chromide of cadmium, and 240 parts of water, so as to be equally wet on both sides, and is then hung up to dry.

2. *The Treatment with Silver.*—The dried, woven fabric is passed through a solution of four parts by weight of nitrate of silver, one part of citric acid, and 140 parts of water, and again dried.

3. *The Exposure to Light.*—For this purpose it is generally preferable to use electric light, which may be produced by a dynamo-electric apparatus. In all other respects the proceedings are the same as in the production of magnified photographs by means of the solar camera. The sensitised woven fabric is exposed to the light until the positive photograph is distinctly visible thereon. The time necessary for this exposure depends upon the size and strength of

the negative—generally one to four minutes are required; but it may be added that although the use of electric light is generally preferable, other artificial light or the solar rays may be used in the process.

4. *The Development.*—A solution composed of ten parts of pyrogallic acid, forty-five parts of citric acid, and 410 parts of water is put into a large flat pan, and the woven fabric is left in the solution until the photographic picture or print thereon is sufficiently developed.

The remaining proceedings are as usual in photographic processes. The picture is well washed, then toned and fixed, and finally again well washed.

It is evident that, without departing from the substance of this invention, other sources of light and other iodides and chromides may be used for producing magnified photographs on woven fabrics.

Having thus described the nature of this invention, and in what manner the same is to be performed, as communicated to me by my foreign correspondent, I claim—

First. Woven fabrics provided with magnified positive photographs, essentially as described.

Second. The process for producing magnified positive photographs on woven fabrics, essentially as described.

Third. The process for producing magnified positive photographs on woven fabrics by the use of iodide or chromide of silver, essentially as described.

Fourth. The use of electric light for producing magnified positive photographs on woven fabrics when these are impregnated with iodide or chromide of silver, essentially as decribed.

Although we have printed the specification precisely as published, we are tempted to inquire if by the "chromides" spoken of throughout the specification the *bromides* are not really meant?

Want of time and pressure upon our space prevented our replying last week to Mr. Bennett's "plea for extra sensitiveness." We hasten now to say that that gentleman slightly misunderstands the drift of our arguments in the article to which he refers. Our object was not in the slightest degree to detract from the value of extra sensitiveness in dry plates for special purposes, or when used under the same advantageous conditions as wet plates. A more thorough exposition of our views on the question we could scarcely require than the last paragraph in Mr. Bennett's article, in which he shows the cause of the want of regularity of dry plates—a fault which he states to be common to both quick and slow plates. In this we quite agree with him; but we differ in believing that without the wet-plate worker's facilities, the tent, and a "sighting shot" to get the exposure, the quick plate is more liable to error than a comparatively slow one. Mr. Bennett says:—"If two plates require respectively five minutes and five seconds for correct exposures they will be equally over-exposed if they receive respectively six minutes and six seconds." True; but Mr. Bennett overlooks the fact that it is very considerably more difficult to time to within *one second* of the correct exposure than to within a minute. The difficulty lies in our inability to err *proportionately* to the sensitiveness of our plates. In speaking of the "quality of the result" we of course referred to the *printing* quality; the writer's remarks as to the greater softness of negatives produced by means of rapid exposures are perfectly true—at least with the description of subjects he mentions. These, however, are the ones in which rapid plates have the advantage over slow ones, but "general landscape work" includes subjects of a widely different class. Let us suppose an open view, including a not too well-illuminated foreground, and distant mountains in sunshine, perhaps eight or ten miles away; and let us further suppose a rapid gelatine plate to be exposed for a sufficient time to properly impress the foreground—say six seconds—while the distance requires no more than three, or perhaps two, seconds. Where will the distance be upon development? Very far distant, we fancy—out of sight, in fact. Our sole contention is that until the great bulk of photographers are in a position either to judge correctly or to measure the exposure necessary it will be safer to employ plates of moderate sensitiveness, leaving the luxury of extreme rapidity to those happy mortals who have attained the necessary aptitude in outdoor work.

AMATEUR PORTRAITURE.

The editorial article in the last number of The British Journal of Photography on *Window Portraiture* deals with a subject which should have a special interest for a large class of amateurs who, like myself, find but rare opportunities of practising their hobby in the field. One cannot be for ever exposing plates upon the same cut-and-dried subjects near at home, even though "home" be situated in a very paradise; for, no matter how technically perfect the results may be, their sameness soon destroys all interest and enthusiasm in the practice of photography. But where, as in my own case, the prevailing character of the local scenery is bricks and mortar and groves of chimney pots, matters are even worse; and, despite its noted unremunerativeness, the amateur is glad to work off some of his superfluous energies in the practice of portraiture.

But, as the Editors have pointed out, the absence of suitable arrangements for the purpose too often acts as a deterrent, though, as they go on to remark, there is no absolute reason why this should be so if only the amateur be content to confine his efforts within moderate bounds. I have myself for some years dabbled a little in portraiture under almost every possible condition an amateur is likely to encounter, and the result of my experience is that, for quality of results no less than for convenience, I give the palm unhesitatingly to the system of indoor work described in the article to which I refer. Whether this favourable opinion arises from my having recently paid close attention to this branch of photography or to some inherent superiority in the method I do not pretend to say, but I have a strong feeling that the latter is the cause, and if my testimony be of any value in inducing others to take up portraiture I have great pleasure in giving it.

The first great point which will arise for consideration in the minds of intending portraitists will, no doubt, be the process to be employed. Wet plates have hitherto been so inseparably connected with portraiture, both professional and amateur, that they will at once assume the leading position in such mental calculations; but many dry-plate men will, I venture to say, hesitate before committing themselves again to the employment of the bath, though it be only for portrait work. Yet there is no necessity to take the backward step. All recent evidence is strongly in favour of dry plates as compared with wet in point of rapidity; and, as this has been the one feature in which the latter class of plate has previously excelled the former in its suitability to portraiture, there remains no reason why it should not be substituted. Personally I have not "gone in" for the very high degree of sensitiveness which is now obtainable with dry plates; but I have found no difficulty in working with what I may, I suppose, term a "moderately" sensitive emulsion—one, in fact, which with the full aperture of an eight and a-half inch focus rapid symmetrical requires from six to ten seconds for a fairly-lighted, open landscape at this season of the year.

Such an emulsion, when used dry, I have found to require from fifteen to twenty seconds with a half-plate portrait lens and full aperture, the arrangements as to lighting being such as I am about to describe. If, instead of drying the plate, it be washed and organified it follows that the exposure will be still further reduced. Even with an ordinary emulsion, prepared with just a trace of free bromide and exposed before the film has become dry, the exposure under similar conditions does not exceed half-a-minute. This is certainly rather a long sitting for a nervous individual; but it must be remembered that the chemical conditions are not such as to be conducive to rapidity, while it will be seen that my mechanical arrangements are such as to render needful a longer exposure than would be sufficient if special attention were given to the element of rapidity.

I may premise that there is nothing peculiar in the arrangements of the room in which I usually operate, unless it be its apparent unfitness for the purpose. It is long and rather low, and is lighted by two windows placed at such a distance apart that only one can be brought into play at once. The windows, too, are small, measuring only three feet six by two feet nine, the longest dimension running vertically, and the extreme height of the top of the window six feet from the floor. If my readers will compare these figures with the area of glass in an ordinary studio, the length of the exposures I have mentioned will not be difficult of explanation. It is obvious that with a window of larger vertical dimensions a much larger quantity of light would be admitted, and that of better quality, as it would proceed from a better illuminated portion of the sky.

The only additional arrangement I employ consists of a light framework about six feet square, formed by nailing together four strips of deal. Over this, when placed in position, I throw a sheet to act as a reflector for lighting up the shaded side of the figure—a purpose which it answers admirably. I obtain a variety of effects in lighting by merely altering the position of the sitter with regard to the window and arranging the reflector accordingly. When the relative positions of the sitter and the window are such that the camera cannot be conveniently got into position I frequently, with advantage, interpose a mirror between the lens and subject, and thus secure a result equivalent to placing the camera outside the window.

I never attempt anything beyond a bust or vignette portrait, as my light is insufficient to properly illuminate a larger area; indeed, confining myself within those limits, I find it necessary to place the sitter as close as possibly can be to the window and to bring up the reflector in close proximity to the shadow side. It is surprising how small a space between window and screen suffices to leave a clear background space round a bust or half-length figure. I have sometimes worked within the limits of barely three feet, securing ample room for vignetting.

For general purposes I place the screen parallel with the window at a distance of about four feet, and the sitter and the camera at the opposite ends of a line drawn midway between them. A full face taken in this position (direct front light being totally absent) would have a peculiarly harsh effect from the strongly-marked contrast between the two sides of the face; the shadows are, of course, much stronger with this style of illumination than if a direct front light, or a side light extending to a greater distance from the sitter, were used, and hence the object is to avoid presenting too much of the shaded side to the lens. If we cause the sitter to turn slightly towards the window, so as to present a three-quarter face, we find that, though the eyebrow and the curve of the cheek are lighted up, the rest of the "off" side of the face remains in deep shadow, and the result, unless a very long exposure be given, is harsh and patchy in the extreme. If the inclination be in the opposite direction, however, we have three quarters of the face lighted, while the heavily-shadowed quarter face is in better position to catch the light reflected from the screen, which is then arranged to produce the best effect.

If a more evenly-lighted picture be required—that is to say, one presenting less of the "Rembrandt" effect—the sitter must be placed directly facing the light and the mirror brought into play. The reflector is then scarcely required, the shadow being produced by moving the sitter more or less away from the centre of the window, the mirror being placed so as to catch the desired "view" of the face. Half-an-hour spent in studying practically the various effects obtainable will teach more than columns of written instructions, so I will now pass on to another subject—development.

For landscape purposes I am not greatly in favour of carrying the use of alkaline pyro. too far—certainly not to the complete intensification of the negative; but when a portrait negative is in question I think it is decidedly better than silver. Its progressive developing action even during intensification tends to soften the harsh shadows which silver intensification gives, especially on a slightly under-exposed plate or when a slow emulsion is used. Ferrous oxalate answers admirably for the development; but density must be obtained by means of *alkaline pyro.* and not with silver, or the result will prove to be much inferior—such, at least, is my experience. Two plates similarly exposed and developed respectively with alkali throughout and with ferrous oxalate followed by pyro. and silver showed so strong a difference in favour of the former as to suggest a difference of nearly two to one in the exposures.

In conclusion: I think the character of negative obtained with bromide plates developed entirely with alkali is eminently adapted to portraiture, and, if properly exposed, the image is soft and round. A very little under-exposure, however, produces an opposite result; but I think I may fairly say that my failures in this direction arise from working a slow emulsion under decidedly trying and disadvantageous conditions. In a properly-constructed studio and with a sensitive emulsion I have not the slightest doubt that much quicker exposures may be given than with wet plates, and that the results obtained will be in no way inferior. In fact, I am sanguine enough to join Dr. Nicol in believing that the general adoption of emulsions in the studio is but a "matter of time." W. B. Bolton.

THE APPLICATION OF PHOTOGRAPHY TO THE PRODUCTION OF PRINTING SURFACES AND PICTURES IN PIGMENT.

IN SIX LECTURES.

I.—PHOTOLITHOGRAPHY AND PHOTOZINCOGRAPHY.

[A communication to the Society of Arts.]

When a photographer wishes to take a picture he, as a rule, begins by making what is technically known as a negative, this being a transparent picture having the lights and shades reversed. Now, here is a negative. As I hold it before the lime light you see that the parts corresponding to the dark portions of the original are transparent, and those parts which correspond to the lights of the original are opaque. Here, on the other hand, is a positive or transparency, of the same subject as the negative which you have just seen, the lights and shades of this being as those of the object represented. A negative taken from nature should show the reverse of all those gradations of light and shade which characterise natural objects, while a negative taken from a line engraving or a page of letterpress should show only two gradations—complete opacity and clear transparentness. Here is such a negative; and, notwithstanding the fact that the opaque parts are not quite opaque to the sight, they are chemically opaque—that is to say, they will not allow the photographic rays to pass through. I have nothing to say to you regarding the making of negatives, as this matter belongs to photography proper and not to our present subject.

Here is a sheet of paper which has been so prepared as to become darkened on exposure to light. Let us place this behind our negative, and allow the light of burning magnesium to shine on the face of the negative. You see the result: those parts of the paper which were covered by the transparent parts of the negative have become dark, while those parts which were protected from the light by the opaque parts of the negative retain their original white colour. Thus a positive print is obtained on paper; but if the paper print be now exposed to daylight the whole will become dark, the picture, consequently, disappearing.

This operation illustrates the first phase in the process of photographic printing as usually practised, the next step being that of unsensitising the paper, so as to prevent the complete darkening which would otherwise ensue on the further exposure of the print to light. Our object now is to study the means of producing printing surfaces (plates or blocks) from which copies can be printed without the direct action of light being concerned in the production of each print.

The piece of paper which I now hold in my hand is sensitive to light, and I will place it under this negative of a line drawing, and expose to the action of an intense light. You observe that a very faint brown image is now produced on the sensitive paper by the action of the light shining through the transparent parts of the negative; and I now hide this from your view by covering the face of the paper with a thin and uniform layer of printers' ink. For this purpose the ink is diluted with a little oil of turpentine, and applied by means of a dabber made of the glue and treacle composition which typographic printers use for making ink-rollers. The oil of turpentine soon evaporates, and leaves a compact and thin film of printers' ink on the paper. I next put the inked print into water, and leave it there while I tell you how the sensitive paper was prepared. A sheet of plain paper is first floated on this warm solution of gelatine (containing six per cent. of gelatine), and it is then hung up to dry (as I do now). When dry it is insensitive to light, and it may be kept any length of time without injury. To make it sensitive to light it is soaked for a few minutes in this solution of potassium bichromate, which contains about three and a-half per cent. of the salt, and it is once more hung up to dry, but this time in a dark room, or in a room illuminated by yellow light. When dry it is ready for exposure under the negative.

Let us now return to the inked print which we left soaking in water, and try the effect of gently brushing the inked surface with a wet camel's-hair brush. You see that the ink is gradually coming off; but in order to save time let us employ a little warm water, and, at the same time, continue to use the brush. Now, the end of the matter is that the printers' ink becomes removed from all those parts of the paper which were not exposed to the action of light, and an image in fatty ink is thus obtained on the gelatinised paper. From this I now remove the excess of water by means of blotting-paper, and lay the print, inked face downwards, on a clean and slightly-warm lithographic stone. The stone and paper being now passed through the press, you see that the paper adheres firmly to it, but on moistening the paper with a sponge it becomes easily removable. Now I strip it off, and you see that the fatty ink is fixed on the surface of the stone, leaving a perfect but reversed image thereon. Remember that this image consists of fatty printers' ink, and that it penetrates a short distance into the porous stone. Next, I put some thick gum water on the stone, and this also penetrates a short distance into those parts of the stone not already covered with printers' ink. I now rinse off the excess of gum and apply the inking roller. You see that the ink only adheres to those parts already inked; the gummed parts resist the ink, and consequently remain white. A sheet of paper being now laid on the stone, I now pass the stone and paper through the press, and you see that I get an exact counterpart of the original fatty image (technically called a "transfer") which was put down on the stone. Numerous copies may be printed from the stone by repeating the damping and inking.

You will recollect that when the light-brown image was inked with printers' ink the ink covered the whole face of the paper; but when this inked image was put into water the ink became easily removable from the unexposed parts. Now, gelatine which contains potassium bichromate undergoes a remarkable change when exposed to the action of light. It not only becomes brown in colour but it loses its property of swelling in water, and, at the same time, it refuses to be moistened; in fact, water rolls off it just as from a duck's back. Now, when the inked print (transfer) is put into water the unexposed parts of the bichromated gelatine swell and loosen their hold on the fatty ink, while the exposed parts neither swell nor absorb water but hold the ink firmly. In this dish are some uninked transfers, which have been soaked in water, and, if you examine them closely, you will be able to trace those parts of the gelatine which have swelled, leaving in each case a delicate *intaglio* image or representation of the negative employed.

Instead of putting the photolithographic transfer down on a lithographic stone, it may be put down on a zinc plate, and the plate can be printed from, if treated exactly as the stone was treated. There are on the table some zinc plates and stones, with images transferred thereon, together with proofs from them; and there are also specimens illustrating the various phases of photolithography and zincography. Messrs. Whiteman and Bass, who have been most successful in the commercial practice of photolithography, have kindly lent me some very fine specimens of their work, which I am sure you will examine with much interest. There are also on the table some admirable specimens of work by Mr. Maurice Adams.

You understand that, in its usual form, photolithography is only adapted for the reproduction of line subjects, or subjects in extreme black and white, and various attempts have been made to render it available for the reproduction of the gradations of a negative taken from nature. By a modification of Asser's starch process I have been enabled to get results which are at least encouraging. Here is a sheet of blotting-paper, which I now cover with ordinary flour paste containing eight per cent. of flour. The paper having been coated it is next smoothed with a soft badger brush, just as I am doing now, and when dry the paper is soaked in a three and a-half per cent. solution of potassium bichromate, in order to make it sensitive to light. This piece of the sensitive paper, being placed under a negative, and exposed to the light of burning magnesium for a few minutes, soon becomes tinted with a brown colour where acted on by light, as you see. The light-brown print is next soaked in cold water in order to remove the unaltered portion of the potassium bichromate, after which it is dried and ironed with a warm flat-iron, just as I am ironing this one. This last operation is to harden the coating. I now put the ironed print into water, take it out, lay it on blotting-paper, and dab on printers' ink with a stiff brush. You see that the ink adheres to those parts where the bichromated paste has been made insoluble by the action of light, and it refuses to adhere to those parts where the paste remained unaltered. In this way a fatty transfer is obtained which, as you see by these examples, shows all gradations of a negative taken from nature—not, however, as a true half-tone, but as a grain or stipple well adapted for transferring to stone or zinc. As a fine image of this kind is liable to get clogged up when printed from stone it is better to transfer it to a plate of zinc, and to make a typographic block from this by the method which I shall describe in a subsequent lecture. In the interval I will convert this zinc plate into a typographic block, and you will be able to compare these proofs, printed by the lithographic method, with others which I will take from the typographic block.

I hope some of you will experiment on Asser's process with the view of improving it, as this method affords a promising field for work, it being specially adapted for large pictures.

THOMAS BOLAS, F.C.S.

EDINBURGH PHOTOGRAPHERS' HOLIDAY.

THE annual holiday under the auspices of the Edinburgh Photographic Society came off on Thursday, the 18th inst., the locality chosen on this occasion being the beautiful grounds surrounding Winton Castle—the quaint, picturesque residence of Lady Ruthven. As year by year the advantages of such holidays become more significantly recognised, the exertions of the acting committee in bringing about something like a general closing of the establishments in the city is found each year more easily accomplished, and on this occasion a very close approximation to a universal suspension of business was attained. The original object of the institution of the holiday was to afford an opportunity for employer and employed to meet together on equal terms in the enjoyment of social intercourse at least one day in the year, and with the view of inducing as many as possible to join the excursion it has always been the aim of the committee to afford the best possible entertainment at the smallest possible cost. How well they succeeded in the present instance may be gathered from the fact that, for a payment of seven shillings and sixpence and five shillings for gentlemen and ladies respectively, the party was conveyed to and from Winton, and luncheon, dinner, and tea were provided, including an unstinted supply of beverages, ranging from soda water to champagne—so unstinted, in fact, that even some of the latter was brought back to town. Food for the mind and ear and a stimulus to "twinkling feet" was also provided by a string band, which at intervals was wont to "discourse most excellent music," while prizes to the value of over ten pounds were given to successful competitors in athletic and other games.

Of course on all such occasions there are many who, when such opportunities occur, prefer to visit friends or relatives, or plan individual trips on their own account; but notwithstanding such defections from the general excursion the party numbered one hundred and five when assembled at the Waverley station. At 9 30 a.m. the special train started, and had a pleasant run to Winton station.

Winton Castle is a picturesque building of the time of Charles II., with some modern additions not by any means so picturesque. It contains some exceedingly fine carvings and mouldings, and a series of perfectly unique chimney-pieces of exquisite workmanship. The Castle is surrounded by many fine, old, and large trees and extensive shrubberies, affording most grateful shade from the intense heat that prevailed.

The party having assembled in front of the Castle, the President, through whose influence permission to visit the grounds had been obtained, briefly intimated the orders of the day, and in the name of Lady Ruthven gave them a hearty welcome. Her ladyship, he (the President) said, regretted very much her inability to be present, and had even wished the meeting postponed for one day to enable her to meet the members; but, as that had been found impossible, her ladyship had requested him to give the assemblage the welcome he then did.

A substantial luncheon commenced the business of the day, and then the party broke up into groups, all betaking themselves to the kind of amusement best suited to their individual tastes. The younger members joined heartily in various games under the direction of Messrs. Pringle, Bashford, Mathison, and Wishart, or were tempted to "chase the glowing hours with flying feet." The more elderly preferred to recline in the shade, listening to the music and watching the ever-changing gaiety of the scene—a "sight the careful brow might smooth."

At 1 30 p.m. two photographic groups were successfully taken by Mr. John Annan, after which all sat down to dinner, the President occupying the chair. Mr. Pillans was, as on several previous occasions, purveyor, and discharged the duties to the satisfaction of all present, the viands being of the best quality, in ample abundance, and well and promptly served. After dinner,

The PRESIDENT said that it was neither the time nor place for many toasts or lengthy speeches, but as patriotic Scotchmen, who thoroughly appreciated the liberty which they enjoyed, and who loved the Queen with all the heartiness of a loyal people, they could not rise from the table without the time-honoured toast. He then proposed the health of the Queen and all the members of the royal family.

The toast was, as usual, enthusiastically responded to, followed by the singing of two verses of the national anthem.

Mr. J. G. TUNNY said the only other toast was that which he had been asked to propose, namely, "Prosperity to the Edinburgh Photographic Society." He thought it unnecessary to say a word on behalf of the toast, as the Society and its work were as well known to most of those present as to himself. It was a satisfaction to all connected with the Society to know that although advancing in years there were no visible signs of decay, and that it was one of the most useful and hard-working societies in existence. Not the least important of the many good works it had accomplished in its time was the inaugurating, and year by year carrying out, the annual holiday; and for this, if for nothing else, it deserved the warmest thanks of all present. With the toast he begged to couple the name of Mr. Lessels, the President, to whom the Society was deeply indebted for many favours, and who had been one of the best presidents they ever had.

The toast was received with acclamation, and, in reply,

The PRESIDENT said he undertook the duties of the office with much uncertainty as to his ability to discharge them properly; but in consequence of the courtesy of the members generally, and the ever-ready help of those more intimately acquainted with the working of the Society, he had found less difficulty and more pleasure than he had anticipated.

After dinner the games were resumed, the amusement generally being carried on with unflagging energy. The whistle gave the signal for tea at five o'clock, but "the cups that cheer but not inebriate," did not seem so much in favour as the previous repast, as it was with difficulty the party was gathered together for the presentation of the prizes at half-past five o'clock. This was, however, at last accomplished, and the prizes were presented by Mrs. Lessels as follows:—

Games.	Prize.	Winners.
Bowls.	1.—Gentleman's silk umbrella	Mr. W. D. Young.
	2.—Gentleman's sporting knife	Mr. G. N. Campbell.
Skipping Rope.	1.—Ladies' companion	Miss Davies.
	2.—Silver pebble cross	Miss Johnston.
Battledore.	1.—Handsome lady's parasol	Miss McGregor.
	2.—Album	Miss Finlayson.
Spelling Bee.	1.—Stereoscope and dozen slides	Mr. Hannah.
	2.—Book	Miss Finlayson.
Ladies' Race.	1.—Ladies' companion	Miss Ann Calder.
	2.—Silver pebble cross	Miss Calder.
Gentlemen's Race.	1.—Album	Mr. Calder.
	2.—Large photograph	Mr. W. Mathison.
Hop, Step, and Leap.	Concertina	Mr. Maclean.
Sack Race.	1.—Water-colour drawing	Mr. W. Mathison.
	2.—Framed picture	Mr. W. D. Young.

Probably the most interesting feature of the day was the "Spelling Bee," which was admirably managed and well contested, the excitement towards the close being very intense. Miss Finlayson and Mr. Hannah were well matched, and went through a rather severe ordeal with many words not in frequent use, the lady ultimately making a slip by doubling the "l" in "stalactite."

At 5.30 the order of march was given, and at six o'clock the train left Winton station and rapidly conveyed the party back to Edinburgh —all highly delighted with the proceedings of the day, and feeling that another success was scored in favour of the Photographers' Annual Holiday.

PHOTOGRAPHY IN COURT.

LOMBARDI *VERSUS* VANDERWEYDE.

This case was heard in the Queen's Bench Division of the High Court of Justice before Mr. Justice Field and a special jury, in the Guildhall, on Wednesday and Thursday, the 17th and 18th inst. It was an action instituted by Mr. Lombardi, the well-known photographer, of Pall Mall, London, and Brighton, to recover from Mr. Vanderweyde, Regent-street, the sum of £72 10s. upon an "I.O.U.," and a further sum of four guineas the cost of a picture frame. The case arose out of certain transactions in connection with a patent studio window which, as every reader of The British Journal of Photography is aware, was patented by Mr. Vanderweyde a few years ago, and which was the subject of much comment in this Journal. Mr. Murphy, Q.C., and Mr. Findlay, instructed by Mr. Percy Burt, appeared for the plaintiff, the defendant being represented by Mr. M'Intyre, Q.C., and Mr. Kingsford.

From the opening remarks of Mr. Murphy it appeared that soon after Mr. Vanderweyde introduced his patent studio window an arrangement was made in accordance with which the defendant was to erect a window of this kind in the Pall Mall premises of the plaintiff, and which was to cost a certain sum. When the accounts were handed in by the builder it was found that the amount claimed was £72 10s. in excess of that agreed upon. Mr. Lombardi, however, paid all the claims and took Mr. Vanderweyde's "I.O.U." for the sum in excess, that gentleman representing that he had no money at all at that time. Upon being afterwards applied to Mr. Vanderweyde refused to honour his "I.O.U.," alleging that he had given it as a guarantee that he would erect a similar window in the plaintiff's studio in Brighton—an order which, although agreed upon, was afterwards countermanded. From what was further said it appeared that the case had been previously heard by the Judge in chambers, who granted permission for its being tried only on condition that Mr. Vanderweyde should first deposit the amount craved for in court, to recover which the present action was brought.

Mr. Lombardi said that in September, 1875, he first saw the defendant at the studio of Messrs. Fradelle and Marshall, Regent-street, where several gentlemen interested in photography were present to witness the trial of a new studio window erected under the supervision and in accordance with the patented method of the defendant. That studio was erected by way of experiment. He (the plaintiff) was subsequently informed by defendant that he had quarrelled with Fradelle and Marshall, and being at loggerheads with that firm he could not use their studio for show purposes, as originally intended, more especially as it had not been constructed entirely in accordance with his plans, and that the district surveyor had found fault with it on the ground that it had been erected contrary to the regulations of the Board of Works. He further stated that the position of the witness's studio in Pall Mall East would be a most desirable position, and that if the glass-house were erected it would be to the mutual advantage of both of them. The witness explained that, as the lease had only six years to run ere it expired, he would only consent to it in the event of the cost being moderate. The matter, however, ended in his being persuaded to have one of the defendant's windows erected. Mr. Thomas Over, a builder, having been sent for, the defendant explained to him the nature of the alterations he wished to be made. Mr. Over gave an estimate for £49 10s., which sum the plaintiff agreed to pay. The work was then proceeded with under the direction of Mr. Vanderweyde, the plaintiff not interfering with the work. Without the knowledge or consent of witness the defendant caused considerable alterations to be made which had not been included in the builder's estimate, thus increasing the amount of the bills, which, instead of amounting in all to about £50 as had been anticipated, amounted to £149 10s. It was not until several months afterwards that witness discovered that so much additional work had been done, and on the 17th March, 1876—at which time he had become aware of the additional expenses incurred—he had an interview with the defendant and severely remonstrated with him for having incurred so much additional expense, when the defendant admitted he was entirely to blame, and that as the bills were so much heavier than at first proposed he was willing to pay one half the expenses, amounting to £72 10s.; that he would leave witness to settle with the builder upon the best terms he could, at the same time stating that he was quite penniless, but would give witness his "I.O.U." for £72 10s. This offer was accepted the same day, and witness paid all the bills upon receiving the "I.O.U." in question. Having frequently made application for payment of this amount without avail, the witness placed the matter in the hands of a trade protection society. The witness then discovered that defendant had no means of paying the amount, and that he had a bill of sale on his furniture. The matter was then abandoned for a time until he was known to be in a position to pay, when the present suit was instituted. On the 14th March, 1876, or three days before the "I.O.U." was given to him, the defendant asked him for a testimonial for his window, at the same time stating that he (witness) had a very commanding position to show off his patent at his Brighton establishment, and that if he (witness) would give him a testimonial he (the defendant) would erect one of his windows there free of charge. Witness thereupon, at defendant's dictation, wrote a letter ordering the erection of a window at his West-street studio in Brighton. As that letter did not state anything as to who was to bear the expense of the window in question, witness called defendant's attention to this fact, who promised to speak to his partner upon the subject and then to write a letter to witness indemnifying him from any responsibility or liability in connection with the expense to be incurred. Witness waited two or three days for the promised letter, but not receiving it, and fearing that he might be involved in expenses as he had been in connection with the Pall Mall studio, he wrote on the 16th March countermanding the order.

Cross-examined by Mr. M'Intyre. In reply to the question why, if the Pall Mall studio had proved such a failure as he had reported it to be, did he give such a powerful testimonial in favour of it as he had done in the form of an order to erect a second window in Brighton, witness said that the failure of the Pall Mall studio window did not arise from any defect in the principle of the method of lighting, but in the special manner in which that principle had been carried into effect in the Pall Mall studio.

Mr. Over, builder, was examined and gave evidence in detail in regard to the nature of the alterations made upon the studio. He had received all his orders from Mr. Vanderweyde, and not from Mr. Lombardi.

Mr. Vanderweyde said that he was the inventor of the patent window in question, which was a great success. He was an artist and not a photographer, never having taken a photograph in his life. He superintended the erection of the new window in Mr. Lombardi's studio, which was to be for show purposes as an advertisement for both of them, and which photographers were to be invited to see; but, while doing so, he never authorised the builder to make any departure from the terms of his contract or to incur additional expense. When the plaintiff afterwards complained to him about the increased cost he replied to him that it was not his fault; he had used his best exertions to have the work done properly. The plaintiff then suggested that as the testimonial which he might give defendant would be from such a well-known man in the profession it would be worth his (witness's) interest to pay half the bills. He was disgusted with the plaintiff for having so offered to sell him a testimonial, but as the plaintiff had hinted that he might do his invention a great deal of harm, he considered in what manner he would be able to protect himself; so, abandoning the idea of using the Pall Mall studio as an advertisement, he offered to build another studio at Brighton instead of paying any part of the bills. He urged this proposal upon the plaintiff, and asked for a letter to the effect that owing to his (plaintiff's) being so much satisfied with the studio in London he wished him (defendant) to build another one at Brighton. The plaintiff said he must give him some security that he would pay the workmen, because if he (defendant) did not meet the claims, the workmen being on his property, he (plaintiff) would have to pay them. Thinking that the cost of building the new studio would be about half that of the London one he gave plaintiff the "I.O.U." for the £72 10s. He said, however, that he must consult his partner before he proceeded with the new studio. He had at that time made up his mind not to build the new studio, but only to use the letter as a means of defence. As plaintiff had remarked that it would not do for his letter and the "I.O.U." to be of the same date, he dated it the 17th instead of the 14th October. He soon afterwards received a claim from the plaintiff for £76 odd, and then he wrote a letter asking particulars of the claim, which were furnished by the trade protection society as consisting of the "I.O.U." and the frame.

The Judge: What did you do after this?—Witness: Nothing. I never heard from them again.

The Judge: Were you not applied to by the solicitor of the society? The defendant denied that this had been the case; he had never heard from them.

The Judge then requested the production of a letter which had been written by the defendant in reply to the solicitor of the society.

The counsel for the defendant had never seen such a letter.

The Judge, however, asserted that he had seen it on the previous day in their possession.

Mr. M'Intyre: Then your lordship must have got it, for it is not here.

Mr. Lombardi (starting up) said that if the original could not be found he had an authenticated copy which he would be happy to submit to his lordship. The letter was read by his lordship, who inquired of the defendant's counsel what he could possibly have to say in the face of such a document.

Mr. M'Intyre said that whatever the defendant might think as to the rights of the case nobody else could now possibly have any doubts on the subject. The letter in question came upon him like a thunderbolt.

Defendant: But the "I.O.U." is worthless!

Mr. M'Intyre (addressing defendant): That may be your opinion, Mr. Vanderweyde, but it is not the opinion of any honest man in this court; and, throwing down his brief, Mr. M'Intyre sat down.

The Judge said that Mr. M'Intyre had done his duty bravely on behalf of his client, and no blame was attributable to him. One of the stories told was consistent with the documents in the case, and the other story was not consistent. The jury must therefore give a verdict for the plaintiff for the full amount, with interest and costs.

A verdict and judgment were then entered in accordance with his lordship's instruction.

CLUB PORTRAITS.—WADE *VERSUS* EVANS.

At the Clerkenwell County Court, on Monday last, the 22nd inst., the case of Wade *versus* Evans was heard before Mr. Besley, the deputy-judge.—The plaintiff said he was induced to become a subscriber to the defendant's photographic portrait club by seeing some specimens exhibited in the Hope public-house, Calverton-street, Islington, in consequence of which he, from time to time, had paid in small sums the sum of twenty-one shillings; but as the defendant had not executed the portrait nor returned the money he had brought the present action, which he would have done earlier but the defendant had left his old place of business, and he had great difficulty in finding his address.—Henry Hare, the landlord of the public house in question, proved receiving the plaintiff's subscriptions and handing them over to the defendant from time to time. This evidence completed the plaintiff's case. The defendant said the plaintiff having also changed his address he had difficulty in getting him to sit, or he should have been glad to have finished a portrait for him, and he told the plaintiff this when he called; but the plaintiff became so very abusive he had ordered him out of the shop, as he created quite a disturbancce at the time. He (the defendant) said he had offered that morning to pay the costs of the summons and take the plaintiff's portrait, but he refused. The plaintiff (recalled) said he refused because the defendant's portraits were not equal to the specimen, and because he had got one elsewhere much better at less cost.—The Judge ruled in favour of the plaintiff for the full amount claimed with costs, remarking in doing so that from the recurrence of these cases before him he was of opinion that people were very foolish in parting with their money to these so-called clubs, when they could go to well-known photographers who would at once submit their negatives to the public without prepayment.

ON THINGS IN GENERAL.

One of the latest absurdities is the pre-exposure of sensitised albumenised paper to obtain extra rapidity in printing. Can there possibly exist a photographer who would risk the spoiling of his pictures by the degradation of the whites through letting light upon them after printing? The effect would be precisely the same if he allowed excess of light before printing. And this promised gain—what is it? The diminution of the time occupied in printing by a few seconds. The thing carries its contradiction on the face of it. Most of us have had our printers use paper that had accidentally got a slight tint from the light getting to it, but I am sure no one ever heard of such paper printing any quicker than usual.

This suggestion will help Mr. Foxlee's experiments in carbon and silver. Here is silver printing twenty or thirty years' old, and yet this wonderful improvement was never before discovered! What may we not expect carbon to do twenty years hence at the same rate? I am inclined to think that Mr. Foxlee has hit the nail on the head, and it is the apparent simplicity that fascinates the learner in carbon printing, and leads to all the more disappointment when it is found that the process is not such child's play after all.

When M. Lambert was exploiting his process through this country all who saw the methods of working, which were simplicity itself, were so charmed with their ease and beauty that the purchase of a licence followed as a matter of course. And yet I fancy at the present day there are many more licensees than workers, and this not through any fault whatever in chromotype, for it is unquestionable that this gentleman's tour was the means of popularising carbon printing to a vast extent. It is only as yesterday that the beautiful prints in pigments done by his process were exhibited to the wonder of the profession, and the improvement that has taken place since then is most marked, and now for every single carbon printer before this event there must be dozens now in actual practice. I should think that not the least of the disappointment in the details of the process would be found when, a good sheet of carbon prints having been obtained, an attempt was made to mount them upon the cards. To this day this is by no means a light trouble.

I am rather amused to see gravely put forward as a reason for selecting carbon before silver that it will not distort a picture as printing in silver does. Truly I have now and then seen a silver print that seemed a little "out of square," but out of a thousand *cartes* done in silver I will undertake to say that not more than one prominently distorted case could be found. How would this distortion act in the case of the typical photographs which we are asked to aid in collecting out of our own districts? The "anthropologicals" should see to it.

Pre-exposure and fogging, wet collodion negatives, pre-exposure and spoiling of albumenised paper, having been duly suggested, I found myself trying to imagine what next could be invented in opposition to accepted canons of photographic practice. Strongly-acid bath, alkaline bath, alkaline collodion, iron developer without acid, all had been recommended—what else could be thought of? Happy thought! Throw something in the negative bath and spoil it, and get poor, washy negatives, and then patent the process. And here is the very thing in print:—Put a quantity of sugar of lead in the silver bath and then a good dose of nitric acid, and proceed. It gives thin, grey negatives and seldom fogs, and it would just be the thing for Rembrandts. During winter it gives "well-harmonised light and shade." So says the *Archiv*. Who will try this and report? I do not think I shall be able to find time, much though it may be desirable, to obtain weak, grey negatives.

It will be strange if we do not hear of some case of sunstroke among photographers from the effects of the tropical heat we have experienced of late. Let me advise one and all not to touch alcoholic liquors as a drink quencher. I am not at all a teetotaller, but I can recommend a drink of aerated water as being better than anything for the purpose, and a good-sized gazogene would be a most desirable addition to every photographic studio in the kingdom at this period. I saw a communication from Mr. E. Dunmore in these pages describing the erratic behaviour of some carbonate of soda, and it occurred to my mind that either he or the chemist who supplied him must, in these days of effervescing drinks, have made a substitution of tartaric acid for the soda, the two substances, in due proportion with a little sugar, forming a decidedly pleasant and often-vended mixture in hot weather. Any way, to see carbonate of soda of the most inferior description turn litmus paper pink is a most marvellous phenomenon! Free Lance.

THE BIG SHOW.

The Smoking-Room.—The Tharsis Photographer.—The French Pictures.

Going into the smoking-room after the day's pleasures are over we drop upon another field of research. Everybody wants to know what everybody else has seen, and all seem to be at sixes and sevens, each taking an interest in some department quite different from that which engages his neighbour's sympathies.

"Show of fine arts magnificent, sir," said one gentleman to another who was seated at the other side of the table, and who replied—"Haven't been to see the pictures yet; I've been here for three days, and have been amongst the machinery all the time. The Americans are making great headway in that department"—

"I don't take an interest in machinery," the fine-art gentleman replied, turning to find a kindred soul elsewhere.

"Talking of machinery, sir," said an old man from the corner of the room, "Did you see that new reaping machine, by————?"

"No!" the other broke in, "I don't go in for agricultural implements; they possess no interest for me." The old man said no more.

A gentleman who sat next to me quietly smoking his cigar remarked, with a smile, "Whenever he gets the chance that old man has been doing nothing but talk of the cattle show and agricultural implements for the last six or eight nights."

"Every man will have his speciality," I replied, "and that being the subject that is uppermost in his mind he will naturally like to talk of it." "Yes, that must be it," he said, taking the cigar from his mouth and sending the smoke whiffing up into the air. "Personally," he continued, "I'm not great in any particular branch of manufacture or production save what we produce from our own mines, and that holds no interest at the exhibition."

"Your own mines?" I remarked inquisitively, seeing he was so communicative.

"Yes; I hold the position of chemist at Tharsis, and have been taking a tour to improve my health. I've been in Paris for about two months, and I can tell you that sitting here of an evening listening to the various ideas propounded I gain more information and enjoy more fun than you would ever dream of."

"I do not doubt it," I said, as the hum of many voices came upon our ears as we conversed.

"And it is strange to sit and see the faces changing day after day—new men ever coming, and the faces that were beginning to grow familiar melting out of sight for ever."

"You will get up many of the subjects without going to the exhibition at all" I observed, with a smile.

"Oh! yes; and the eagerness with which they tackle the subjects is marvellous," my friend replied in an easy manner. "I just sit in amazement." "Have you seen the Japanese court?" one friend will say to another, evidently quite full of it; and without preliminary he starts at once to unload his treasures in glowing description, when the other would break in with—"I don't care for Japanese stuff! I hate *papier machie* and bronze; and their goods always smell of snuff, which makes me sneeze." And thus Japan is sneezed out.

Another will say, "The French pictures are very fine—magnificent conception and careful execution." But his companion, with a curl of the lip, would reply—"Yes; you've hit it when you say 'careful execution,' for it seems to me that the artists use their lives to paint the horrors of death. Why it's all blood and murder and dead men's bones! Drinking wine out of skulls, and that sort of thing, is'nt in my way."

"Why, sir," continued my friend, "I have seen twenty men sit down here during the evening, each possessed of a subject of his own, and differing from all the others, as if each had started a liking on his own account, and so in conversation he failed to get that sympathy from his neighbours that he could have wished. Now *you* will have some special liking," he said, looking at me and smiling.—"Yes, I replied; photography is what I take most interest in."

"Oh! indeed!" he said; "that puts me in mind that there is a man in that art did the art-ful by us in our town. Why he owes a dozen of *cartes* to every inhabitant in the place, save and except those that were born since he visited us!"

"How could that be?" I asked; "was it a bet?" "Oh! no, a regular business transaction. He came amongst us as a photographic artist, and not having one resident amongst us we engaged him; old and young, rich and poor rushed to his tent to have their likenesses taken, and which had to be paid for at the time of sitting. After performing with his camera and lens on every soul in the place, he told us that he would have to print them at home and send them on to us, carefully noting down our addresses, and blessing us ere he departed. 'Only that and nothing more,' for never a picture reached us from that day to this, and it is a year ago now! For a few weeks after the artist had left the ladies especially were all impatience, waiting and wishing for a sight of these pictures; but mail after mail brought disappointment after disappointment, and hope died out. Some folks thought that the artist must have been a thief, and others that he might have fallen amongst thieves, but in either case we were *taken* in."

"Not a pleasant recollection of our profession," I said. "Oh! it would never do to judge of the firmament by a falling star," he replied, smiling.

It was evident that his remarks had drawn two or three together that took some interest in the art-science, for a gentleman who had sat himself down at our table remarked—"Photography is well represented in the French department of the Exhibition. I spent the best part of the day there, and, although it is only from an amateur's point of view that I take an interest in it, I felt well repaid for the time spent."

"I was also in the French department today," I replied. "Liebert's work was what first attracted my attention, and it is really well worth a careful inspection."

"Yes; carbon work seems to be his special feature, and his specimens show that he is a thorough master of that branch of the art."

"M. Alophe shows two cabinet pictures fitted into one frame—back and front—which moves round on a clockwork stand. Did you see them?" "No."

"Both pictures are of the same lady and gentleman. As the frame comes round, moved by the clockwork, the picture shows the gentleman's back to you and the lady facing you, with a balustrade dividing them; then, this moving round, the other picture comes into view, the lady's back being shown and the gentleman's front view. The idea is novel and the effect pleasing."

"I did'nt notice that; I must look out for it when I go again. But I saw some instantaneous work, by Sauvager, of Fontainbleau, as good in that way as anything I have ever seen."

"Yes, it was very good indeed. Thiers' dry-plate work was also excellent."

"The way they have the lantern transparencies fixed up is very effective—running them up in a framework against the window; with that black box, about a foot deep, fitted round them, it produces an effect which can never be obtained by leaving them open to the daylight all round."

"Yes; and I'll tell you another thing I saw there, which, if introduced, would extend the sale of transparencies for window decorations. That was the edged framing of different-coloured glasses—ruby, and blue, and green, and yellow—leaving the centre square for the transparency. Many beautiful things could be got in that way."

"You would see Walery's enamels;" "my friend said they were exquisite."

"Ioliot's pictures attracted a great many of the visitors. The backgrounds were printed in quite black, so that the figure had the effect of standing out, producing a statuesque effect."

"Oh! yes; I saw them."

One thing I observed in connection with the French department in which my newly-found friend agreed with me; it was this—that the richness of the frames and fittings in almost every case took away from the beauty of the picture, and the tendency was to forget the jewel in admiration of the setting.

MARK OUTE.

Meetings of Societies.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

A MEETING of this Society was held on Friday, the 17th May last,—Dr. Vogel, the President, in the chair.

Two new members having been admitted, a number of cabinet pictures by Dr. Richard, of Männedorf, were laid upon the table. These were portraits of living persons, having for backgrounds different Alpine views.

Herr Hartmann thought that scenes of dramatic interest, such as those shown in Dr. Richard's pictures, lay beyond the proper limits of backgrounds for pictures.

Herr QUIDDE asked what were the gold contents of the different gold salts used in photography.

The PRESIDENT replied, giving the following particulars:—Anhydrous chloride of gold ($Au\ Cl_3$) contains 64·9 per cent. of gold; chloride of gold and sodium ($Au\ Cl_3\ Na\ Cl + 4\ H_2\ O$) contains 45·4 per cent. of gold; chloride of gold and calcium ($Au\ Cl_3\ K\ Cl + 5\ H_2\ O$) contains 42·08 per cent. of gold. He also expressed his preference for chloride of gold and calcium, as it crystallises well and is not acted upon by the atmosphere, while the other gold salts (such as chloride of gold), are deliquescent, and thus undergo a change in their combination. The formation of beautiful crystals is a sufficient guarantee of the purity of the preparation. If it contain an excess of the alkaline chloride the preparation will be powdery, as in the mixture of chloride of gold and sodium and common salt, well known under the name of "gold salt," in which one cannot tell the proportion of gold contained without analysing it chemically.

Herr MAROWSKY remarked that it was principally for the last reason that he preferred to prepare his gold salt himself; but the details of his process would be rather long to give here.

Herr QUIDDE asked whether the present gold money of the German empire could be used for that purpose.

Herr WENSKE said it contained too much copper.

The PRESIDENT remarked that he considered pure chloride of gold ($Au\ Cl_3$) too deliquescent for photographic purposes as usually sold, but that it could be obtained in hermetically-sealed glass tubes from Herr Schering.

Herr JOOP did not permit his chloride of gold time to absorb moisture from the air, as he dissolved it as soon as he got it.

Herren WENSKE and SCHAARWÄCHTER, who both use chloride of gold, said they kept it in a dry place, and had not been troubled by its melting.

The PRESIDENT showed a very successful daguerreotype from an oil painting taken in the year 1839, by the late Herr Sachse. The picture was in very good preservation, though most of the others of the same date had faded. He (the President) further said that the most even of M. Daguerre's own pictures of that period had fallen victims to the action of time, but in the King of Bavaria's private collection he had seen some that were in good preservation.

Samples of Berthold's plate-cleaning paper were then laid on the table.

The PRESIDENT introduced the subject of Mr. J. W. Swan's dry plates, remarking that they required a strong alkaline developer, and that with its assistance it might be possible to work as rapidly as with wet plates, but that the strong developer was more likely to produce stained plates than a weak developer.

Herr SCHAARWÄCHTER remembered that the rapid action upon Mr. Warnerke's plates was most evident when the light was good, but that when the light was poor these plates were far behind wet ones.

The PRESIDENT said that phenomenon generally accompanied all bromide dry plates, as they were most sensitive to the light blue rays, the intensity of which was much less in poor light, while ordinary wet plates were more sensitive to the violet and dark blue rays, which were proportionately less weakened in bad light than the light blue rays.

Herr HENSCHEL showed a number of prints the lights of which were covered with yellow spots. The spots generally made their appearance about a day after the prints were mounted, and with greater frequency when glazed with gelatine. The speaker had tried English paper, which remained free from spots; but as, on the whole, he preferred the German paper, he was anxious to discover the cause of the spotting.

Herr SCHAARWÄCHTER said he had found these spots make their appearance when blotting-paper was used for drying and rubbing them down, and when the blotting-paper was too often used.

Herr HENSCHEL admitted that the pictures had been dried with blotting-paper.

Herr SCHAARWÄCHTER observed that he had once had some paper covered with black spots when printed (iron stains he thought they were). He gave some to Herr Fechner, whose prints were likewise spotted, and some to Herr Marowsky, whose prints were quite free from specks, but neither had been able to find out why.

Herr SCHAARWÄCHTER then asked whether any one had tried the muriatic acid cure for blisters in albumenised paper.

Several members present said they had tried it, but not always with good results.

Herr RICHTER remarked that it could only take effect when the directions for its use were followed out exactly. The process was as follows:—When the pictures have been taken out of the toning bath wash them once or twice with clean water, and then place them one by one, if possible, in a bath to which three or four grammes of muriatic acid is added for every litre of water. In this bath move them about two or three minutes, and then float them for the same time, but no longer, in pure water, so that the muriatic acid may be rinsed off, but not be altogether removed from the interior of the paper. Then place them in the fixing bath. According to his (Herr Richter's) view of the matter, the muriatic acid remaining in the paper decomposed some of the hyposulphite of soda, and threw off some sticky sulphur, which made the albumen adhere better. He thought most of those who had tried this plan had washed too long before fixing, and thus completely washed out the muriatic acid.

The PRESIDENT had great doubts as to the correctness of Herr Richter's theory, and saw no advantage in precipitating sulphur, but feared rather that it would have a bad effect upon the permanency of the picture.

The discussion then wandered to other methods which had been formerly recommended as cures for blistering; after which

Herr WENSKE said he had found his plan a radical cure, even in the most obstinate cases. When he found his albumenised paper beginning to blister he floated it, with the albumen side up, upon a water bath containing four per cent. of a mixture of chloride of sodium and chloride of ammonium. Upon that bath the sheet was allowed to float until the albumenised side felt sticky. It was then dried and silvered as required for use. The addition of the salt to the water was necessary, as otherwise the water would soak out all the salt from the paper. Care must be taken not to let the water rise over any part of the albumenised side, or else the skin of the paper would be injured. He (Herr Wenske) wished the albumenisers would undertake the operation, and save photographers the trouble.

Herr HARTMANN stated that his printing-room, being in a cellar, was cool, even during the hottest summer, and he was never troubled with blisters.

Herr VAN RONZELN asked—(1) Whether paper-makers were able to produce paper which could be warranted absolutely blister free, he having seen a statement to that effect in a photographic journal. (2) Whether paper made at once from one lot of pulp could partly blister and partly be quite free from blisters.

The PRESIDENT said he must answer "no" to the first question—that, to his knowledge, a paper which would under all circumstances remain free from blisters did not exist; and, as even the best paper would blister if kept long in a very hot, dry place, he must answer "yes" to the second question.

At the conclusion of the meeting the President showed a very interesting experiment. It is known that most collodion cotton gives an opalescent collodion. This appearance is caused partly by fibres of the cotton wool having remained undissolved, and partly by the calcium contained in the cotton, where its presence can easily be demonstrated by spectrum analysis. He (the President) then burnt a small particle of collodion cotton before a spectroscope, when two very characteristic lines—one green and the other red—appeared, though, owing to the rapidity with which the cotton exploded, a good look-out had to be kept in order to distinguish them. To show that these were really calcium lines he then put some calcic chloride in the flame, when precisely the same lines showed themselves in the spectroscope as with the collodion cotton. At the request of Herr Quidde the President also showed the spectra of the absorption of fuchsine and naphthaline red. First the light of a gas flame was thrown by means of a mirror upon the spectroscope, upon which a continuous spectrum was shown. Then a test tube filled with fuchsine was placed in front of the slit in the spectroscope, whereupon the green of the spectrum was extinguished and a black line of absorption took its place. The colour of naphthaline red can scarcely be distinguished by the eye from fuchsine, yet its absorption in the spectrum is quite different; it shows two lines, while fuchsine only shows one.

ANOTHER meeting of this Society was held on Friday, the 7th ult.,—Dr. Vogel in the chair.

Herr Schaarwächter showed a camera, after which,

Herr Herrmann (of Siemens', of Dresden, glass manufacturers) read a paper upon toughened glass, in which he remarked that they had not yet been able to cut it with a diamond. The speaker then exhibited a variety of articles made of Siemens' pressure-hardened glass:—

1. Some thick pieces of glass which had crystallised during the eight days it had taken to cool them. This glass had no resemblance in appearance to what we understand by glass, it being much more like stone or slag.

2. A sheet of glass which had taken eight days to cool, and which looked like opal glass.

3. Plates of matt glass. These are produced by coating a sheet of glass with a mass of glass and burning it in. The grain is so fine that there would be no difficulty in using it as a foundation for carbon pictures. It has the advantage, also, over a grain produced either by etching or by grinding of not being injured by the touch of greasy or dirty fingers. Amongst the sheets of ground glass were some having a pattern produced in the same way.

[On being asked whether Siemens' factory could produce ornamented sheets of glass for carbon window transparencies like the French ones which were in the market, Herr Herrmann replied that he had no doubt it could.]

4. Some bent sheets of glass for windows, roofs, &c.

5. Photographic glass plates which were perfectly clear and smooth.

[Herr Herrmann thought that the use of this glass would in a great measure prevent cracks in varnish caused by the expansion of the glass, as the pressure-hardened glass did not expand nearly so much as ordinary glass. Several of the members present took plates with them for experimental purposes.]

6. Transparencies and negatives upon hardened glass. Pieces of the glass were thrown about, and one piece broke, showing a crack like ordinary glass, and not crumbling to atoms like *verre trempé*.

Herr HERRMANN showed the peculiar polarisation of the hardened glass, and said he believed it could be sold at about thirty per cent. over the price of common glass. The hardened glass was stated to be perfectly clear and not dim, like *verre trempé;* it would also stand changes of temperature better, and could be bored or ground, though not cut with a diamond.

A letter from Herr Wilde was then read, and a negative which accompanied it was laid upon the table. It was a reproduction of a linear drawing taken by Wilde's process, and very powerful though not intensified.

The subject of the transmission of collodion cotton was again brought up and discussed at some length, but nothing new transpired.

Herr MARTINI mentioned Schering's non-inflammable collodion gelatine, which furnishes collodion on simply being dissolved, but said that the collodion was turbid.

Herr HERRMANN gave an account of photography by electric light in England, which was supplemented by Dr. VOGEL giving an account of Mr. Vanderweyde's studio.

The meeting was shortly afterwards adjourned.

Correspondence.

BANQUET IN PARIS IN HONOUR OF PHOTOGRAPHY.

A BANQUET to the foreign members of the Jury for Class XII. (photography), at the International Exhibition, Paris—namely, M. Luckhardt (Austria), Mr. William England (Great Britain), M. J. J. von Kerkwyk (Holland), M. Louis Lechner (Hungary), M. Lewitzky, Vice-president (Russia), and Mr. Henry C. White (Connecticut, United States)—was given by the Photographic Society of France, the Syndical Chamber of Photography, and others, and was honoured by the presence of numerous distinguished guests, among whom I recognised Mr. A. L. Henderson and Professor Stebbing.

Before each chair at the substantial and elegantly-furnished table in the banqueting room was a prettily-decorated *menu* of the dinner, bearing the printed name of each guest and thus marking his place, and which was provided by the photographer's friend, the well-known M. Hutinet.

During the dessert,

M. PELIGOT, member of the Institute of France, and President of the Photographic Society of France, rose and made a speech, in which he said, in effect, that it was his pleasing duty to welcome and honour the photographic community of all countries. Photography was everywhere progressive, and still produced new results and created new wants little dreamed of at the time when the three illustrious inventors—Niepce, Talbot, and Daguerre—first heralded their discoveries. He well recollected when, in 1839, Arago, with all his powerful and soul-stirring eloquence, proposed that France should present to all peoples the great discovery of photography. Daguerre was pensioned by the French nation with six thousand francs a-year, which was then thought a large and adequate remuneration; but, judged by the sum of thirty millions of francs—the amount realised by the affairs to which the art-science gives yearly life and movement—it seemed a small gift. Since that epoch what changes have been wrought! Pictures and portraits had ceased to be produced on silver plates; and paper, albumen, collodion, and the carbon process have, in succession, usurped its place. It was at first considered wonderful, and was patronised by the wealthy and well to do; but now photography had penetrated everywhere, receiving hearty welcome in a million homes, and providing daily bread for thousands, while it is now, when greatly perfected, aiding us to study the scenery of every clime and enabling men of science and astronomers to show us details of other worlds before unknown. An old proverb said that it was beautiful to see oneself in a mirror; but now they had reason to be content, for they could hold the mirror up to Nature herself. The utility of the science and art of photography could not any longer be contested, and the world acknowledged the aid it received. Let them fancy for one moment what would be their position were they suddenly deprived of its help and solace. Instead of their standing still their daily appliances aided the progress of photography, and France in her noble and honourable *rôle* offered to their international colleagues her hearty welcome and generous hospitality. He proposed this toast:—"Let us honour our guests, the foreign jurors of Class XII., who have responded to our invitation and graced this grand assembly with their presence."

The toast was enthusiastically received.

Dr. Hornig, President of the Photographic Society of Vienna, in responding, said that he could never forget that he then stood in the birthplace of photography, and remembered the memorable occasion when that great orator, Arago, aroused the world with his eloquence upon the then recent great event and discovery which resulted in his noble idea. And what an idea it was! That the conquest of mind over matter should, by the generosity of the great French nation, become the property and inheritance of all, thus enabled to reap what was so generously sown. Arago, no doubt, in the poetic visions of his eloquence, had seen the future birth of the Photographic Society of France, who cherished his great idea, and who would continue to do as it had already done, by its powerful assistance, propagate to the further ends of the world the art and science of photography—that great and ever-memorable work of distinguished and noble Frenchmen, from whom it had derived thought and being in the birthplace and cradle of the arts—in noble Paris!

M. Lewitsky proposed the health of M. Davanne, to whose integrity, impartiality, and scientific abilities they were so greatly indebted.

M. Davanne, in acknowledging the toast, said that he could accept only a share of the praise thus bestowed, for much honestly belonged to his colleagues. Photography might justly raise its head; for, commercially, it produced yearly thirty millions of francs. It was all-popular for the good it did. In the cottage, by its images, it replaced the absent ones, however far distant they might be; and in the council of the state, as well as in the study of the *savant*, it was equally welcome, for its works were truth itself.

Thanks were also accorded to M. Peligot, M. Berger, M. Dietz-Monin, and to M. Jules Simon.

M. Jules Simon, Senator, then made an eloquent speech, which was listened to with profound interest. At the close of his remarks he (M. Simon) said:—"Much has been said about the transformations of our time, of the telegraphs, of our increased means of communication. The world will be the gainer. You, who compel the sun to do your bidding and transfix the human lineaments imperishably upon your tablets, regardless of the class they represent, have reason to be glad; for science has progressed for the advantage of all, irrespective of class, as may be seen in the repetition of universal exhibitions—even in congresses, united as now, let us hope, for the mutual benefit of humanity, and to promote the interests of peace and labour and concord. Multiply international exhibitions, which lead to know—and to know is to open the hearts and arms of the people one towards the other—and thus make hatred to sleep for ever. May our foreign visitors return to their cherished homes bearing good seed! And may they plant in their turn what they have seen and heard, so that swords and guns shall be turned into ploughshares and spears into pruning hooks!"

Thus ended this notable instance of "the feast of reason and the flow of soul." W. Harrison.

Asnières, Paris.

INTENSIFYING GELATINE NEGATIVES.

To the Editors.

Gentlemen,—Having been troubled for some time by the thinness of the image obtained upon gelatine plates, I read the letter of Mr. A. J. Reily in last week's number with a sympathising interest.

It is a long time since I ceased to be thus troubled, and for the benefit of this gentleman, and perhaps of other readers who experience the same annoyance, I will describe my method of working.

First of all, I may state that I *now* obtain all the intensity required in my negatives by the expedient of dissolving my gelatine in water to which has been added a tolerably large proportion of beer; the particular kind which I make use of is an old Burton sample, for which I pay at the rate of five and sixpence per dozen imperial pint bottles. Other ales would doubtless answer quite as well; I only mention this kind as that which is used by me. Two or three years ago I saw this beer-y suggestion made in this Journal, and I immediately adopted it with much success, and several times since then I have mentally recorded a vote of thanks to him who made the suggestion, but whose name is to me at present unknown.

In the second place, even although the image upon the gelatine film be very feeble, it may be intensified with greater ease than if it were a collodion picture. The method I adopted, and which I still adopt when I decide upon further intensification, is to fix the image in hyposulphite of soda, wash it very thoroughly, and allow it to become dry. I then immerse the plate in a very weak solution of pyrogallic and citric acids, to which about two or three drops of a ten-grain solution of nitrate of silver have been added. Under this treatment the image acquires the requisite degree of intensity, and the only care that is needed to be exercised is to prevent the image from being over-intensified, for the peculiar colour of the deposit in a gelatine negative, although it may appear thin, is so non-actinic as often to lead to the over-intensification of the image by the photographer who does not sufficiently realise this fact.

If these hints prove useful to any reader I shall be pleased.—I am, yours, &c., T. J.

July 23, 1878.

To the Editors.

Gentlemen,—In reply to your correspondent who cannot succeed in obtaining density with gelatine plates made in accordance with Mr. Bennett's formula, my own experience is just the opposite. I get too much density, some negatives taking a day to print. I find the cause generally of non success with Mr. Bennett's formula is that photographers do not adhere closely in all the minutest particulars which he has laid down as essential.

I never use distilled water for developer, nor do I ever intensify with silver. If a negative is properly exposed, rather over than under, any amount of density I find obtainable from this process, and this, I think, is the peculiar charm, as with other gelatine plates I have never been able to get sufficient density in the sky.

To show how difficult it is to make people understand: in answer the other day to a gentleman's inquiry as to how he was to develope gelatine plates I sent him minutely-detailed instructions. By the next post I received a letter asking the following questions:—Did I really mean strong ammonia? Should he not add half of water, and could he not use a little bromide?—I am, yours, &c., Wm. Wainwright, Jun.

Hoe Place, Woking, July 23, 1878.

MR. C. BENNETT'S RAPID GELATINE PLATES.

To the Editors.

Gentlemen,—I was very much interested in reading Mr. A. J. Reily's experience with these plates, for I, too, have experienced precisely the same results; in fact, it seemed like reading my own experience to the very letter.

I know that thin negatives by this process are attributed to over-exposure; but in my case I am sure the plates have not been so treated, for I have exposed with a drop shutter and an exceedingly small stop—in fact, tried every conceivable means to obtain a good printing negative, but all to no purpose. I may say I have used up eighty-five ounces in experimenting and cannot succeed, although the emulsion is all that could be wished for as regards rapidity. I am fully aware that I must be wrong somehow, but where I cannot possibly tell.

I think I shall express the wishes of numerous other readers by asking Mr. Bennett if he will kindly give us a helping hand out of the dilemma.—I am, yours, &c., J. M. J. Danks.

5, *Jesson-street, Coventry, July* 20, 1878.

Ways and Means.—Quick processes appear to abound, and photographers will no doubt ultimately realise their obligations to the lightning man for kindling the fire that has smoked them out. Various are the ways and means by which compensation is sought. One man sells "permits." Another sells the "secret." A third sells the collodion and developer at an enormous price, so as eventually to get as much as the secret man and the permit put together. You pay your money and you take your choice, and *vice versâ*. *Vive la rapidité!* This is the sum total up to date. We are equally ready to get up the chemicals for anybody else's process, or to publish any good process anybody may send us. If anybody has any lightning in him with which he wishes to electrify the profession gratuitously, now is the time for him to strike.—*Anthony's Photographic Bulletin.*

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

I will exchange a No. 5 wide-angle landscape lens, by Dallmeyer (never been used), for a half-plate, quick-acting portrait lens by the same maker.—Address, "Photographer," 45, Claypath, Durham.

ANSWERS TO CORRESPONDENTS.

Photographs Registered—

A. G. Massey, Armagh.—*Three Portraits of W. G. Lyttle.*

Edmund Eccles, Bury.—*Photograph of Bury Parish Church.*

Charles F. Perry, Birmingham.—*Two Portraits of the Rev. C. Leach.*

Charles Cook, Scarborough.—*Four Photographs from "Colleen Bawn."*

Adam Gosney, Sherborne.—*Two Photographs of G. D. W. Digby, Esq.*

Edwin Debenham, Weymouth.—*Photograph of the Rev. T. A. Greaves.*

John White, Salford.—*Two Portraits of Francis Harrison Walmsley, Esq., Mayor of Salford.*

James Cooper, Darlington.—*Group of Wesleyan Ministers.—View of Darlington Grammar School.*

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

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

B. F. Villers.—Your theory is defective; the thing has been done.

Charles F. Richardson (Wakefield, Mass.)—Remittance to hand. Thanks.

W.—The old and much-overlooked glycerine process will answer your purpose quite well.

Charles Waldack (Cincinnatti, U.S.A.)—Remittance to hand, and placed to your credit. Thanks.

C. D. B.—Let the portrait partake more of the profile nature, and, of course, do not let the defective eye be seen.

J. D. M.—By making use of a dish the same solution of pyrogallic acid may be utilised in the development of several negatives.

G. W. Brown.—Old lacquer may be removed from brasswork by immersing it in a boiling solution of washing soda. The solution should be a somewhat strong one.

John Simpson.—We are familiar with the process indicated; it is that of Whipple, of Boston. It certainly was patented, but the patent expired several years since.

Electro.—We are using your cardboard dark slide as a guide, and are trying to construct one of a similar kind for ourselves. We shall report upon it after a trial. Thanks.

J. M.—It is probable that there is a chloride mixed with the carbonate, and that, in consequence, chloride of silver is formed, which lies at the bottom of the bath after the carbonate has been used up.

Tyro.—When in a formula the proportions are given in "parts," it may be held as indicating either grains, ounces, or any other kind of measurement, which, however, must be adhered to throughout.

J. T. Robinson (Sunderland) encloses a few samples of portraits taken in a private room several years ago when he was acquiring a knowledge of photography. They are certainly excellent specimens of our art.

J. K.—It does not seem probable that the acetic acid can be at fault; we, at anyrate, are not aware of any instance in which the contact of a cork with the acid has caused fogging when such acid was used in the developer.

W. W.—Most of the iodides will impart a slightly yellow colour to the alcohol. If a deep colour be wanted, which, with some samples of pyroxyline is desirable, the addition of a few drops of an alcoholic solution of iodine will secure this end.

X. Y. Z.—1. Change the sample of collodion for one rather more porous, and see that the plate be well drained after removing it from the bath.—2. If thoroughly drained and kept in a damp atmosphere the plate will remain quite good for three hours. See also answer to "W. D. H." in our issue of July 12.

One in a Fix.—To remove the scum from the top of the solution in the sensitising bath, lay upon it a slip of blotting-paper, to which, when raised up again, the scum will be found to adhere. It would, however, be much better if the chemicals were kept in such perfect order as to prevent any scum from forming upon the surface.

S. S. S. (Dalston).—Now that the weather is so hot, it might prove interesting if you were to try the effect of placing in the bottom of the camera an india-rubber tray containing ice. This would soon enable you to determine the influence of a high temperature upon the formation of "oyster-shell" or other surface markings on the plate.

A Merchant.—When sending collodion abroad it is not sufficient that you intimate to the shippors that the case contains collodion; this must also be marked upon the case itself. This question has, possibly more than once, been tried at law, and fines have been imposed for neglecting to mark the case in the manner we have indicated.

Geo. Ewing, Jun.—No better plan for a studio could be devised than that which has been sketched by your friend. With regard to the point upon which you differ, we, too, disagree with you and hold with your friend. He appears to have a very accurate knowledge of the requirements of photographic portraitists, and we should feel indebted if he could be prevailed upon to extend his observations in the form of an article upon lighting the sitter.

A South London Reader.—A very rapid way of washing prints consists in pinning them upon a board and forcibly projecting over them a spray of water by means of one of the ordinary syringes now in common use. The construction of the nozzle ought to be such as to cause the water to be projected as a fine spray but with great force. This will effect the removal of the hyposulphite of soda in the course of a few minutes, and the print will not sustain any damage.

F. R. S.—We have some recollection of a method having been described at the Exeter meeting of the British Association, by means of which all the oblique rays not required in spectroscopy could be got rid of. It consisted of three prisms of such a form, and placed together in such a manner, as to allow the direct rays to be transmitted, the oblique rays being so reflected that it was impossible they could be transmitted. These conditions are fulfilled by placing two rectangular prisms in such a manner that one of the surfaces of each shall be at a right angle to the direct ray, the space between the prisms being occupied by a third prism, the surfaces of which are cemented to the others.

Midland.—You never, on any account, ought to allow the sitter to handle the negative after it has been taken and while it is still wet. This practice has led to numerous fine negatives having been destroyed. If, however, you have any customers who, as reported of the King of Greece, *will* insist upon being shown the negative and handling it in a careless manner, take the precaution of placing it in a light frame, by which the collodionised side of the plate will be protected by means of a plate of glass. With regard to the other query the posing is good, but the print is too full of strong contrasts. This is especially the case with the face, which presents a hard and patchy appearance. This indicates one or other of the following faults:—Defective arrangement of the lighting of the studio; too brief an exposure followed by over development; or chemicals which are of too intense a nature. It will remain with yourself to discover which of these causes is the true one.

W. M.—If the lens be genuine the chemical and visual foci will be sure to coincide, as its reputed maker is very particular upon this point. The want of sharpness will, therefore, have to be attributed either to the dark slide or the ground-glass frame, one of which must be misfitted. To ascertain whether the lens or the camera be at fault, insert a plate of ground glass in the *dark slide*, and, having focussed carefully upon that, remove this slide and insert that containing the usual ground-glass focussing screen. If the image is not quite as sharp on the latter as it was on the former then the camera will require adjustment; but if both are equally sharp the lens must be subjected to a confirmatory test for non-coincidence of focus. To do this, let the image be very sharply focussed upon the plate of ground glass that is inserted temporarily in the dark slide as in the previous experiment, and then let its place be supplied by a sensitive plate of the same dimensions. If after exposure and development the image obtained upon it be found not as sharp as that seen upon the ground surface, then the lens is imperfectly corrected for colour; the chemical and visual foci do not coincide.

Received.—Geo. Cecil Hance; George Young; Colonel Mason; Silvester Parry; and B. Wood.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For the two Weeks ending July 24, 1878.

These Observations are Taken at 8.30 a.m.

July.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
11	29·88	99	69	56	56	60	W	Overcast
12	29·87	94	69	56	57	62	W	Cloudy
13	29·92	109	74	56	56	62	E	Fine
15	30·18	103	72	57	58	63	N	Cloudy
16	30·27	103	77	55	59	64	N	Overcast
17	30·30	112	85	60	63	69	N	Fine
18	30·31	117	85	63	66	73	NE	Fine
19	30·27	115	86	66	68	74	E	Hazy
20	30·14	116	84	62	66	72	E	Fine
22	29·96	117	84	63	67	71	N	Cloudy
23	29·98	102	77	62	62	63	E	Overcast
24	29·73	97	69	62	64	66	S	Overcast

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 952. Vol. XXV.—AUGUST 2, 1878.

AN UNSUSPECTED CAUSE OF FADING OF CARBON PRINTS.

With as much grief as surprise we have received from Mr. J. G. Tunny, of Edinburgh, the details of a discovery made by him in connection with the recently well-worn subject of the "fading of carbon prints."

It appears that Mr. Tunny had received specimens of the "chromotype" method of printing and finishing pictures which had been sent to him with a view of enlisting his sympathies in this class of photograph. These examples possessed a rich bloom, but for some reason which he does not give Mr. Tunny conceived the idea that they were not entirely above suspicion; hence he exposed one half of them to light with the unpleasant result that he found a sensible deterioration caused in the portion exposed to light.

Here is the important point in this discovery: it was found that the alizarine or other pigment by which the tone of the carbon was modified had in this case nothing to do with the fading in question, for the deterioration was most marked in the whites. Of one of the prints, which had been exposed to light for several days, Mr. Tunny says:—"At this moment it presents the appearance of a silver print on albumenised paper when it gets into the yellow or 'old cheese' condition." As we have in our possession the specimen thus alluded to we are in a position to confirm Mr. Tunny's estimate. "After many experiments," he continues, "in the hope of discovering the cause of the dreadful deterioration that had taken place, but without having been successful, the idea struck me that possibly the evil might reside in the first preparation of the transfer-paper."

Acting upon the impulse of this happy inspiration Mr. Tunny immediately exposed to light slips cut from sheets of transfer-paper. These slips he has sent to us, and they unmistakably reveal the fact of Mr. Tunny's having made the important discovery that in the transfer-paper is found the origin of a large amount of the fading which has hitherto been attributed to the pigments mixed with the carbon. In the specimen picture received the yellowing of the print has so reduced the lights that the original brilliancy has been completely lost. The fine bloom and richness imparted by the alizarine has been quite overpowered by the discolouration of the paper support under the action of light. Mr. Tunny remarks:—"At this moment carbon printing is at a standstill; I have not a roll of double transfer-paper that I would risk sending out a picture upon. The commercial loss will be nothing to the heartburnings expressed by dissatisfied customers that we shall have to endure."

This, truly, is one of the most important discoveries in connection with carbon printing that has been made for a long time past. We wish very much that there had been no foundation for the alarm expressed, but of the facts we cannot entertain a single doubt; for we have now before us three slips of transfer-paper which have been partially exposed to light, with the result that the protected portions of each slip retain their pristine purity, while the exposed parts are of a nondescript-yellow colour. These slips are respectively "special double transfer," "single transfer," and "opal transfer." They each bear date of having been exposed to light (part of them being protected) from June 15, 1878, to the 28th of the same month. The kind of paper last named has sustained the least degree of discolouration.

Let us now look this matter squarely in the face. The complaint respecting the fading of carbon prints is very far from being new to us; but on theoretical grounds we have all along insisted upon the impossibility of the whites becoming deteriorated, and on the assumption of the purity of the paper upon which the print is transferred our theory is absolutely unassailable. In the employment, however, of paper so impregnated with any kind of material as to be amenable to the action of light the conditions become altogether changed. That the whites, under proper conditions, *do* remain pure we know both on theoretical grounds and on those based on experience. Even in the letter we received from Mr. Tunny there was enclosed a carbon portrait of his deceased son taken previous to the meeting of the Photographic Society of Scotland held in May, 1864; for, as we very well remember, the picture in question, together with several others in carbon, was exhibited at the meeting of that Society in the month mentioned. This portrait, although over fourteen years' old, possesses whites of absolute purity. It was printed by a modification of Fargier's process, and was transferred from the glass plate upon which it was exposed to a sheet of albumenised paper on which it was developed.

It has always been imagined that a film of gelatine rendered insoluble with chrome alum, and which is popularly believed to represent all the material on transfer-paper, was unacted upon by light, however protracted might be the exposure; but in subjecting this matter to investigation we are met at the outset by this difficulty—that we are not by any means certain in what manner or with what preparations the transfer-paper in question was manufactured. On referring to Liesegang's *Carbon Manual*, recently published, we find that the method of preparing double transfer-paper there described consists in coating paper with a forty-eight grain solution of gelatine containing five to ten grains of glycerine and forty-eight minims of a saturated aqueous solution of chrome alum. It is also stated that, in order to impart a finer surface to this paper, twenty grains of sulphate of baryta, together with small quantities of indigo, ultra-marine, carmine lake, or other colours, may be mixed with the gelatine. If such mixtures as these are to be applied to the paper it is not difficult to discover the point at which fading is induced.

Be the precise cause what it may, we are very certain it is only sufficient that the existence of the evil be pointed out to ensure the speedy application of an effectual remedy; and it is not saying too much that, after having attention thus publicly directed towards a serious shortcoming in transfer-paper, no manufacturer of this article will do his duty properly to the public unless the issue of such paper be henceforth restricted to that which has either been tested or prepared in such a way as to render its stability under exposure to light a matter above suspicion. That such will be the case we are quite confident. Meanwhile, the thanks of photographers are due to Mr. Tunny for having made the discovery of a hitherto "unsuspected cause of fading of carbon prints."

THE FUTURE OF WET-PLATE PHOTOGRAPHY.

If we search through the whole range of photography we shall probably not find one of its adjuncts which through a long course of years has been more consistently abused than the nitrate of silver bath. We need not stay to particularise its numerous faults. Each reader will be ready with a list of real or fancied ones which have been discovered in his own practice; but it is noteworthy that, despite this wholesale condemnation, the bath still retains, in certain quarters at least, its "proud pre-eminence," and forms the basis of all professional work.

Judging by results it can scarcely, then, be said that the bath has proved otherwise than a faithful servant. It has its vagaries, no doubt; but the majority of professional photographers are content perforce to put up with these occasional eccentricities for want of an equally competent but more reliable agent. It is now many years since the bath was doomed *in prospectu* to the limbo of the past; but, though in dry-plate work it has almost disappeared, there are very few professional studios in which it has been altogether relinquished. Many wet-plate workers have long since recognised the advantages to be derived from the occasional use of dry plates; others, again, have been successful in utilising emulsions for certain branches of their work; but, as we have said, very, very few have altogether adopted the latter mode of working.

We can, however, point to a few professional photographers in different departments of the art who have altogether banished the bath from their laboratories, and who, after a careful trial of the new method, declare themselves unlikely to return to the old *régime*. These men we look upon as the leaders of a new movement in photography—a movement which, having already succeeded in landscape work, is now turning to portraiture and other branches of the art, and its final success is, we think, not far distant.

It is so long since the first cry was raised that emulsions would drive the bath out of the field that we have almost come to regard the hopes and expectations in that direction as utopian, and our reiteration of the well-worn opinion will possibly do no more than raise a smile of incredulity on the countenances of our professional readers, who have become so accustomed to the cry of "wolf" as to pass it by unheeded now. But it must be borne in mind by that class that they have listened to the too sanguine views of enthusiastic workers of emulsion processes at a time when emulsion photography was in its probationary stage, and when it had not yet the high degree of excellence which is necessary to their particular requirements.

Now, however, this is changed; for the general principles of the process having been established, progress has settled down into a fixed channel, and the results of recent improvements may be said to lie entirely in the direction of those special qualities which have been hitherto wanting to fit emulsion photography to take its place in the studio as it has already done in the field. The qualities to which we allude are, of course, chiefly rapidity and uniformity, in which respects the best emulsions of the present day are in no way inferior to wet plates under the most favourable conditions. The introduction of improved methods of development, too, will go far to remove the prejudice which exists in some quarters against the adoption of the new mode of working.

We have frequently expressed an opinion that it is the development which forms the chief obstacle in retarding the progress of emulsion work amongst professional photographers. Alkaline pyro. is so entirely different in every respect from any of the methods in use in connection with wet plates that it requires a certain amount of careful study in order to master its action. Professional photographers either cannot or will not afford the time necessary to acquire this mastery, and, if they try at all, give up the attempt in disgust after a few failures. Such, at least, is the only explanation we can give of the apparent apathy in this matter; for in no other manner can we account for the strongly-worded opinions we have heard expressed by some who have tried the alkaline development of bromide plates.

Prejudice, also, we are inclined to think, has a good deal to do with the apparent dislike of emulsions in any form—a prejudice which is by no means confined to wet-plate men. An amusing instance of this came to our knowledge some time ago. A dry-plate worker of many years' practice, and who had in his time worked and succeeded with most descriptions of bath processes, was being inducted into the mysteries of emulsion work by a friend who had become *au fait* in the new style of working. But it was no use, for success refused to attend his efforts. Even when under the direct supervision of his mentor a result *was* scored, it was only acknowledged to be "passable;" some fault was to be found with it. It was too thin, or too dense, or wanting in harmony—in fact, altogether very inferior to a bath plate; and, finally, the experiments were entirely relinquished.

Time passed on and our friend took with him upon a brief tour a packet of plates prepared for him by his quondam instructor by "a new process." Approximate directions as to exposure were given, and the development was to be conducted, according to his usual method, with alkaline pyro. The new process was declared to be excellent, some of the best negatives secured during the trip having been produced by its means. Our friend was all anxiety to learn the details of a process which had succeeded so perfectly at the first trial, and which would in all probability be capable of even better things upon a closer acquaintance. His surprise and, we may add, disgust may be imagined when he was informed that he had unwittingly succeeded in working *the same* emulsion process he had previously rejected as worthless.

But *revenons à nos moutons*. It will be evident from the purport of our remarks that we are in favour of the substitution of an emulsion for the ordinary wet process. Before we can hope to convert the sceptical to our way of thinking the task remains to us of showing that some probable advantage is to accrue from such a change. Let us then endeavour to do so. There are three important points to be kept in view—sensitiveness, reliability, and quality of result; and if without deteriorating any of these properties we can bring about a saving in time, labour, or expense, the subject is one worthy of serious consideration. Let us see what the chances are in this direction.

First, as regards sensitiveness, which is all important in portraiture. It is beyond all doubt, at the present day, that an emulsion may be prepared fully equal in sensitiveness, when used dry, to the ordinary wet plate; but if the same emulsion be employed in the wet state an astonishing increase of sensitiveness is attained, and according to the circumstances attending the preparation of the plate the gain has been variously estimated at from two to four times the rapidity of the bath plate. We need only point to the recent statement of Mr. H. J. Newton, of New York, who declares that with his emulsion he can do anything that can be done by a wet plate and in *one-third of the time*. As to the quality of the results shown in support of this statement we have the authority of Mr. Bierstadt that he had "never seen them excelled, if equalled, by any photographic process."

We come next to the question of reliability. We must admit that one of the charges made against emulsions—especially the more rapid ones—is *want* of reliability or, at least, uniformity. This may be true in one sense, but is not, we think, altogether so. It may arise in two ways: first, from a defect inherent in the emulsion itself; and, secondly, from circumstances altogether outside the emulsion. We can, of course, urge nothing in favour of a defective or unreliable emulsion; but, as it was truly remarked during the recent discussion of Mr. Newton's results, "there is no *chemical* reason why a quick process should not work with the same certainty as a slow one." This brings us to the second consideration; for it is evident that, given a perfect emulsion, elements of uncertainty may (and do) creep in from the difficulty of accurately timing the exposure under varying conditions of light and subject. But in studio work, or even out of doors, when the development follows immediately upon the exposure, this difficulty is removed, or, at anyrate, reduced to a minimum, and the emulsion is placed upon equal terms with a bath plate. From a purely chemical point of view a good emulsion (and no difficulty attends the preparation of such) presents far greater probabilities of uniformity than plates prepared in a bath which is constantly changing in character, and which is, besides, liable to innumerable vicissitudes and accidents.

In the matter of quality of results at least as much will be dependent on the operator as upon the emulsion. We have Mr. Bierstadt's testimony as to the character of Mr. Newton's work, and our own experience leads us to express the opinion that, in regard to quality, the capabilities of emulsions are in no way inferior to the best bath plates when worked with equal intelligence and care. We may, indeed, venture further to predicate that the adoption of the new mode of working will lead to the production of portraits requiring less aid from the retoucher, and presenting in themselves finer modelling than is obtained, except under extraordinary circumstances, in the present mode of working.

Amongst the minor but by no means unimportant advantages is the expulsion of the bath and its concomitant troubles from the studio and the tent; matt stains, "oyster-shell" markings, "dipper marks," and even dust, will cease to trouble. Dust, it must be remembered, forms a very different sort of enemy to wet and dry films respectively. It is no doubt the bane of dry emulsion, but when the film is simply immersed in water immediately after coating the plate it has little power for evil; and even should any become attached to the wet surface it may be rinsed off under the tap, which is not possible under ordinary circumstances with a bath plate.

The saving of time—which, according to proverb, is "money"—forms an important item in favour of the new *régime*. Instead of coating and sensitising each plate separately while the sitter is kept waiting, a number of plates may be coated first thing in the morning before the sitters commence to arrive and immersed in a trough of plain water until required for use. The plate is thus always ready, the sitters are not kept waiting, and no matter how rapidly they come the operator is always prepared. On a busy day the gain from this cause alone would, we opine, be found very considerable in a pecuniary point of view.

Looking at the change from a purely economical point, we may mention the actual experience of a professional photographer who has discarded the bath entirely in favour of emulsion which he prepares himself. Whereas, under his old system of working, his expenditure in silver averaged about forty ounces per week, much of which was wasted, he now turns out the same amount of work with from *six to eight ounces*.

It rests now with the manufacturers of commercial emulsions to push their preparations in the direction we have indicated, and to place before professional photographers an emulsion of good quality—sensitive and, above all, uniform in character. Finally: it might be worth the while of some enterprising manufacturer to institute a series of practical demonstrations, with a view of persuading the profession to give the new system a trial.

PHOTOGRAPHING ANIMALS.

There are few persons known to be possessed of a camera—whether the tyro of a few weeks old or the professional photographer—who have not received an appeal to take a picture of a pet dog, large or small, or a favourite horse, not to speak of cats, which, however, it is but fair to their owners to say are not so often brought forward for the purpose, though they really give less trouble than other animals. The very remarkable Brighton cats that figure so much in the windows of the print shops are not much to the point, as it is evident that to some extent they must be trained; yet, allowing that, we must say that we do not know of any pictures of dogs, trained or untrained, showing such successful effects.

To secure success in this department of photography the operator should possess some little knowledge of the ways of dogs and horses, and some fondness for them; for it is a well-known saying that dogs and babies can tell whether a person cares for them or not, and we believe there is some truth in the idea. In the case of a dog, the first thing he wishes to do when he appears on the scene is to make himself acquainted with the appearance of everything about him, and for a few minutes he should be allowed to investigate matters closely without interruption; he will then be more easily brought into the sitter's portion of the premises, and the difficulty will begin. At the outset the owner, or the man in charge of the dog, should be cautioned not to rate it or speak loudly to it; for if once the animal gets cowed by its master in such an exceptionally strange place as a photographic studio it takes a considerable time to regain its natural bearing, and nothing looks worse than a photograph of a cowering animal, looking as though it were dreading the whip every moment. This caution is all the more necessary seeing that very few dogs are really well trained or obedient, and when the owner wishes one to lie down or stand up, or to assume a particular position, in a particular spot in a strange place in a manner to which it is entirely unaccustomed, it happens more frequently than not that it tries to get behind the nearest chair or table. Then at once its owner will shout at it, angry that his dog refuses to obey; for most dog proprietors are especially touchy about their pet's obedience—just as every Englishman thinks himself competent to drive a gig every dog owner believes he can make his canine companion do whatever he wishes. This bargain being made, the operator will have half his labour saved. The animal must then be walked gently about till he is somewhere near a suitable place, and then either taken standing or persuaded to lie down. A properly-trained sporting dog will do this at once, while some domestic pets are quite beyond control in this respect. It is much easier to take them lying or sitting than standing, as they are less likely to move after focussing, which in any case must be got through very expeditiously. Here much patience will be required. The dog may have to be walked about a dozen times or more before his position is approved of, and when that is found he will, perhaps, move at the moment of uncapping; but with time and patience, combined with *quiet* and *gentle* treatment, he will soon be got into position again and focussed. We may here state that an inside shutter will be found most useful for making the exposure.

The chief point now is to arrest for a moment or two his ever-wandering attention. A *variety* of noise-making toys will be found invaluable, for it is often noticed that a sound that will arrest attention and cause complete immobility for a second or two will utterly fail to cause any impression when repeated a second time. A whistle, a musical box, squeaking dolls, and toys of all sorts will now be found very valuable; and if the operator can mimic barking and growling or imitate a cat-call he need not have much fear of failure. A shuffling of feet or a voice in the dark room will also attract when everything else has failed, and this may act also as a caution that no sound whatever must be made in the dark room while the photographing is going on or the dog will inevitably turn his head or perhaps leap up. A toy carried behind one's back and thrown across the field of view into a corner will often arrest attention sufficiently long to enable a picture to be obtained.

We spoke of the desirability of the photographer possessing some knowledge of the animal he was to photograph, and if a prize dog be brought he will soon find out the wisdom of our recommendation; for its owner will not look at a picture unless its "points" are properly displayed. Thus, if a Skye terrier be brought and so excited that he has curled his tail high in the air in a very pretty fashion—so the operator thinks—and secures him all animation, the latter will be wofully disappointed at being told that his client could not think of sending out "a squirrel-tailed thing like that," and all would have to be gone through again; or the client may become vexed and lost—a consummation most desirable, perhaps, in the case of a tyro, but not to be anticipated by the professional photographer.

When horses have to be taken the same walking backwards and forwards has to be gone through, as a horse with one leg a little awkward looks very bad in a picture; and it is surprising how frequently they stand unsymmetrically, one common mode of posing themselves being to place the hind legs sprawling considerably behind their due position. It generally looks prettier to take a horse with its mane in view, and it is very desirable that, unless a small picture with a long-focus lens is being taken, the animal be exactly square to the camera, as the foreshortening caused by a perspective view of the body causes the hind- or fore-quarters to appear malformed, and is really ugly, though in a sense correct, a horse being such a beautifully-symmetrical animal that the mind cannot make sufficient allowance for the eye when a perspective representation is presented to it.

To attract the attention of a horse is more easy than that of a dog—the waving of a coloured shawl, a whistle, or if these fail the firing of a pistol out of sight, will generally be found to answer all requirements.

If our remarks will aid any one in being successful in this interesting branch of photography we shall be much pleased, for a collection of portraits of "dumb animals" forms an interesting and most attractive sight.

Of the many methods of transferring negative films from the glass, in order to lessen the weight and bulk of the photographer's *materiel* when travelling, perhaps the easiest and most convenient consists in the use of paper coated with insoluble gelatine. But though the removal of the collodion film from the glass is perfectly easy and certain, a difficulty, or at least some trouble, arises if it be desired to re-transfer the negative to glass for printing purposes, from which cause many photographers have been deterred from utilising the system worked with such success by Mr. Woodbury in the production of his series of Italian pictures. If the negative be allowed to remain upon its paper support its printing qualities are seriously interfered with—it may be only as regards rapidity, or it may be by the reproduction of the "grain" of the paper. To obviate this many plans (chief of which is waxing the paper) are in vogue; but none of them are perfect in their action, and all have a tendency to gradually deteriorate the value of the negative by discolouring the paper support. In working the carbon process with such transferred negatives it is only necessary to moisten the paper support with benzole immediately before placing it in the printing-frame—a course of treatment which renders the negative temporarily transparent and free from "grain" so long as it is kept closed in the frame. This plan is not, however, under ordinary circumstances available when silver printing is used; but by a very simple contrivance we have recently been able to apply it with perfect success. The method consists in interposing between the negative and the silvered paper a sheet of transparent gelatine of the thickness of a sheet of note-paper. This does not in any way interfere with the definition of the print, while it is quite sufficient to prevent the benzole contained in the pores of the negative reaching the silvered paper.

ON THE USE OF ALBUMEN IN THE ALKALINE DEVELOPER.

For the past two years I have been experimenting with albumen in various ways in conjunction with the alkaline developer, and have found it to give very admirable results, both as regards being able to give a shorter exposure and extreme delicacy of the image. I also find it very useful in cases (out of doors) when the light is weak and overcast, and when in the ordinary way it would be almost impossible to get a decent result. With its aid I have been able to obtain the most brilliant negatives—equal to anything I have seen. It is my opinion that albumen is almost indispensable where first-class results are to be obtained in collodion dry-plate work, as well as in collodion emulsion used in the so-called moist state. I find, in the last issue of The British Journal Photographic Almanac, an article by Captain Abney, F.R.S., in which he advocates the use of albumen in the preparation of dry plates. In this case he uses it in the preservative; but whether used under certain conditions in the preservative as he describes, or in my way in conjunction with the developer, the results are almost identical. It has always been said by many writers that albumen is a restrainer or retarder—that is, when it is used pure and simple; but when used in an alkaline condition I find its effect is entirely altered. I believe that of late this is getting to be fully recognised.

I think that many are deterred from using albumen for various purposes in connection with photography, as they imagine that it requires to be worked up to a froth and allowed to subside, and necessitates other elaborate preparations. It does nothing of the kind; the preparation is a very simple affair, and can be prepared one or two years in advance. In my hands a sample that has been prepared six months answers better than one that has been prepared and used at once. It can, therefore, be prepared in quantities when eggs are cheap, and be stored away for future use, having it always ready at hand.

I prepare it by the formula originally given, I believe, by Mr. W. Ackland many years ago. After it has been prepared I find that it is best not to put it up in bottles too large. I should advise amateurs to put it up in half-ounce bottles with good corks, as when opened and a portion is used it soon spoils; for professional photographers larger bottles can be used to suit their requirements.

To prepare the stock albumen I break each egg separately in a cup and separate the yolk carefully, taking care to see that each egg is perfectly fresh and free from smell before adding to the whites of the other eggs already broken, as one bad one will spoil the whole. New-laid eggs are best, but shop eggs answer very well. After the requisite quantity of albumen is obtained, according to the quantity that one requires to make, to every eight fluid ounces of albumen mix together one ounce of water and twenty-four drops of glacial acetic acid, and add, pouring it into the albumen in a fine stream, and stirring with a glass rod constantly for one minute. On no account is it to be beaten or whisked up, or the resulting preparation will have a milky appearance. It is allowed to rest for one hour or more, and then strained through a piece of course muslin. To this strained albumen is to be added one drachm of the *strongest* liquid ammonia, after which it is put up in bottles and tightly corked. It is the most elegant preparation of albumen that I know of, and involves very little trouble in its preparation.

Now for its use. Presuming we have to develope a collodion emulsion dry plate: first flow over the plate some dilute alcohol—alcohol four parts, water one part. Allow this to soak well in, pour off, and then place in a dish of clean water to soak, well wash under a tap, and then flow over it of prepared albumen one part, water four parts, sufficient to cover the plate, well rocking the plate all the time. Not less than one minute must be allowed for this operation, or the desired effect will not be obtained. Pour off, and *without washing* the plate pour on the ordinary strong alkaline developer, and if the plate has been properly exposed the image will almost instantly appear and gradually gain in intensity, giving the most beautiful gradations that can be desired, while any amount of intensity can be obtained. If the plate has been under-exposed, after washing the plate it can again be treated with the same solution of albumen, of a similar strength as before, and on the second application of the alkaline developer the image will rush out suddenly. I thought at one time that perhaps it was due to the ammonia contained in the albumen solution, and I found that if four times the amount of ammonia were added without the albumen it would not bring out the image as it would when used in conjunction with the albumen. I believe its action is due to the ammonia dissolving a portion of the bromide of silver, and the albumen then instantly takes it up, forming the organic salt, albumenate of silver, which is very rapidly reduced on the application of the pyrogallic acid. If the albumen were not present, and only the ammonia used on addition of the pyro., the result would be a badly-fogged image. Again: if we omit the application of the alkaline albumen and supply the alkaline developer in the ordinary way the image will come up tardily and sluggishly. If the developer be now washed off and the albumen solution applied, and then once more without washing the alkaline developer is again applied the image will come out with a rush. This system can be repeated provided too much density is not obtained. The most remarkable part about it is that although there is so much energy there is an entire absence of fogging.

In regard to a plate that has been exposed in an even, weak light out of doors it is very common to hear the remark made—"Well, how can you expect intensity if exposed in a bad light? All you can expect is a thin image, and if you push the development all you get is fog." Now by this system of mine in using the albumen, providing sufficient exposure has been given, any amount of density can be obtained with entire absence from fog. At times I have been obliged to expose plates in the worst of light, not expecting to get a decent or passable result, but have obtained a good image—better than could be obtained by ordinary alkaline developer alone. In using it on moist collodion emulsion films I find it of very great service if the plate has been under-exposed, taking care not to use too much pyro. (to give too dense an image). If the image do not appear to come up the plate is well washed and the alkaline albumen solution is applied for a minute, when, on the second application of the alkaline pyro., the state of things will be found to be materially altered, and a good negative obtained.

I also find that if there be a tendency of the film to lift during development it is not found to do so if albumen be used; it is also an aid in developing the plates rapidly. Under good conditions a plate need not take more than two, or at the outside three, minutes to develope, which is a great saving of time; and the resulting image is not to be compared with a negative developed without it, the colour of the image being a rich, creamy colour, with very fine detail.

In conclusion: I would suggest the use of albumen in the development of gelatine plates. I am of opinion that it would give good results, and by its means, I should think, any amount of intensity could be obtained, of the lack of which so many seem to complain. I have not as yet tried it myself on gelatine films, but will do so and report the result. WILLIAM BROOKS.

DENSITY IN GELATINE PLATES.

I WOULD recommend those correspondents who are not obtaining density in gelatine plates to test again for actinic light in the operating-room. The only other causes I know of that might account for the fault are over-exposure, incorrectly weighing the ingredients, and imperfect emulsification.

Faulty scales, which do not, perhaps, weigh to a nicety, might cause thinness, as *less* bromide or *more* nitrate would cause the emulsion to be less dense. With collodion emulsion the action is so tardy that a considerable excess of the nitrate may be present for hours, or perhaps days, and is even necessary. Not so, however, with gelatine, as the latter emulsion immediately loses density, and otherwise becomes uncontrollable. I should recommend great care in not having a larger proportion of *nitrate* than that already proposed.

If the temperature of the bromised gelatine is not so high as 90° Fahr. when the silver solution is poured into it perfect emulsification sometimes does not take place, and the result will not be a creamy film. It also ought to have a very energetic shaking after the silver is added, which helps the emulsion forward into that state; and unless the films, when dry, are creamy it is useless to expose them. Imperfect emulsification is not easily discovered till the films are dry, in which state they are too transparent, and are most frequently granular and slow, being wanting in density—in short, they are useless; but when the right heat is observed and the other points already named are correct perfect emulsification is certain.

If, now, the exposure in the camera be reduced till the plate is decidedly not over-exposed, taking for granted that the light has been thoroughly tested, the result with this exposure must be sufficiently dense; and if reduced till it is *under*-exposed, it will be so dense as to be quite unprintable. I have not yet tried any sample of gelatine that was deficient in respect of density.

I think more mistakes are made in respect of the light than any other part of the process. If the light be not almost perfectly non-actinic the operator cannot employ the strong developer to bring up any density, because he simply developes his fog instead of his picture. CHARLES BENNETT.

A CONTRIBUTION TO THE "FADING CONTROVERSY" IN CONNECTION WITH CARBON PRINTS.

IN April, 1864, when Mr. J. W. Swan communicated to the London Photographic Society his modification of Fargier's process, and for a considerable time afterwards, he would have been a bold man who ventured to express a doubt as to the stability of carbon prints, and probably had photographers been content with the process as then promulgated, or as rendered more practical and easily managed by Mr. J. G. Tunny during the following month, no suspicion of fading would ever have arisen.

That a print in carbon which will not fade can be produced I had ample evidence during a visit paid to Mr. Tunny a few days ago, when he showed me one of the prints exhibited by him at a meeting of the Photographic Society of Scotland, in May, 1864. It was then declared to be superior to a silver print from the same negative, and although no pains had been taken for its preservation—it having recently been unearthed from a collection of rubbish—it is as pure in the high lights and brilliant in the middle tints and shadows as when first exhibited. The method of production, as explained by Mr. Tunny, was as follows:—The glass plate was prepared as usual by a rub with ox-gall, and coated with the bichromatised solution of gelatine, to which had been added a quantity of "gas black obtained by holding a plate of iron over a gas flame. This, when quite dry, was coated with collodion, and then printed under a negative. A piece of albumenised paper, adhesively moist, was now pressed into contact with the collodionised film, sponged over with strong alcohol, allowed to dry, and a knife passed round under the edges, rendering the removal of the tissue so formed an easy matter. The picture was developed with warm water in the way recommended by Mr. Swan.

A print so produced consists simply of unalterable carbon, gelatine, and paper, and, theoretically as well as practically, is what Cæsar's wife ought to have been. Photographers, however—no doubt, in the first place at least, from the difficulty of toning to the pure black of an engraving—had long been sending out their prints in warm shades of purple brown; and, instead of trying to lead public taste back to permanent carbon, Mr. Swan and his followers aimed rather at meeting it by the introduction of questionable pigments. They, of course, had their reward in the almost universal expression of delight which their productions elicited, and consequently when the day of reckoning began to come, and the "thing of beauty" gave indications of a tendency to pass into "the sear and yellow leaf," they tried, and are trying still, to find a purple-brown which *may* not fade, rather than be content with a pure black that they know *will* not.

The controversy regarding this fading is now pretty old, and, like almost everything else, it has its ebbs and flows. At present the tide is somewhat high—mainly, perhaps, because of the importing of a new factor into the question in the shape of an assertion that carbon prints cannot be fixed by the simple action of hot water, and that the fading is caused by a chromium salt left in the paper. Whether this be so or not is a question I shall leave to more experienced carbon printers than myself, as I wish to direct attention to yet another possible cause, and one not, so far as I know, hitherto suspected.

During the already-mentioned visit to Mr. Tunny that gentleman showed me a series of specimens, the result of a number of experiments he had for some time been making, which established beyond a doubt the fact that prints as made at the present time, even with absolutely-permanent pigments, and in which no trace of the exciting chromium salt has been left, are affected by light to such an extent that the whites become brown, and the purity and brilliance are destroyed. The specimens included prints on tissue made by himself as well as on that supplied by the Autotype Company, and also prints the Company had sent him. The half of each print had been exposed to light for about fifteen days, and while the protected half retained its purity and whiteness, the exposed portion had lost much of its beauty and become a dirty brown, easily noticed in the whites by reflected light, and very distinct all over when examined as a transparency. After much trouble and many experiments the fault was traced to the transfer-paper, and Mr. Tunny exhibited several pieces of it, both for single and double transfer, that had been exposed in a similar way, and on every one of which the same degradation of tone was painfully visible.

I am aware that connoisseurs of engravings profess to value the mellow yellowish tint which paper is apt to assume in course of time, and believe that the fashion of printing on "India paper" had its origin in a desire to imitate that tint. But the colour produced on transfer-paper by the action of light is not at all like that acquired by print paper through age, and, if it were, it would still be objectionable, as we have no reason to suppose the maximum effect would be produced in ten or fifteen days, and it is more likely to continue until the beauty of the print is altogether gone.

Assuming, then, that the transfer-paper at present in use is liable to darken by exposure to light, and that it consists of paper, gelatine, and chrome alum, the question as to which of the three substances is to blame is not difficult to settle, although it may not be quite so easy to find a substitute for the offender. There can be no reasonable doubt that pigment printing will by-and-by supersede all other methods, and therefore it is the duty of everyone, as opportunity occurs, to do all he can to eliminate from it every cause of weakness. With this object in view I hasten to direct attention to this objectionable quality of the present transfer paper, in the hope that some of those best qualified to grapple with this matter will turn their attention to it, and I shall return to the subject as soon as a series of experiments now going on are completed. JOHN NICOL, Ph.D.

THE APPLICATION OF PHOTOGRAPHY TO THE PRODUCTION OF PRINTING SURFACES AND PICTURES IN PIGMENT.

IN SIX LECTURES.

II.—PHOTOTYPIC OR RAISED PRINTING BLOCKS, BY SWELLED GELATINE PROCESS, ZINC ETCHING, AND OTHER METHODS.

[A communication to the Society of Arts.]

HERE is a fatty-ink transfer, similar to that which I put down on a lithographic stone during the first lecture. I now lay it on a smooth and clean zinc plate, and pass through the press. On removing the paper, by soaking, we find that the ink firmly adheres to the zinc, just as it previously did to the stone. A treatment with gum now protects the clear parts of the zinc plate against the adhesion of printing ink, and the application of the ink roller adds more ink to the fatty image already on the surface of the zinc plate. So far our present process resembles the photolithographic process described last week; but, instead of printing from the zinc plate, I dust powdered resin over it in order to give firmness to the fatty image, very slightly warm the plate, making the resin and ink partially blend, and then put it into dilute nitric acid, containing one part of acid to about forty parts of water; here it remains for about three minutes, during which time the acid dissolves away those parts of the metal which are not covered by the waterproof coating. Now, let us take the plate out and examine it. We find that the covered parts stand slightly in relief, but only very little, and if we were to continue the etching without further preparation the acid would gradually undermine the lines, and the image would be lost. Now the undermining action of the acid can easily be prevented by washing the plate, drying it, and then heating it sufficiently to just melt the resin. Under these circumstances the melted resin blends with the printer's ink, runs down over the sides of the little ridges left by the etching, and protects these sides from the further action of the acid. Having done this it is well to gum the plate once more, ink again, dry, and dust with resin before proceeding to another etching. This second etching may be done with stronger acid than the first (say one of nitric acid to thirty of water), and it may be continued longer—say for six or seven minutes—and when this second etching is finished the whole series of operations must be repeated until sufficient depth is obtained, care being taken that the melting of the resin is only carried far enough to allow it to flow just over the sides of the relief left by the previous etching. In ordinary cases ten etchings are enough to give the necessary depth; but in the case of important work it may be necessary to give twenty or thirty very slight etchings in order to obtain the same depth, without endangering very fine lines or details.

On the table are some zinc plates illustrating the various stages of the process, and there are also some admirable specimens of finished work by Messrs. Leitch and Co., and by Messrs. Dellagana and Co.

The process of zinc etching has been largely employed for the production of typographic blocks from fatty transfers, either drawn by hand or printed; and this phase of the process bids fair to compete successfully with the art of wood engraving.

There are other methods of producing phototypic blocks, among which may be specially mentioned the method which is founded on the swelling of gelatine. These admirable phototypic blocks, which Mr. Dallas has lent me, are done by a method that he has perfected, but the nature of it has not been made public. Mr. Dallas was the first to introduce phototypic blocks into the English market, and if you carefully examine some of his specimens you cannot fail to be struck by the fineness and perfection of the details.

By the following modification of the swelled gelatine process I have succeeded in overcoming many of the difficulties of the methods already published.

We start with some clear sheet gelatine about one-thirtieth of an inch in thickness. This can be prepared by drying a layer of gelatine solution on a sheet of waxed glass, or it can be purchased from Mr. Cornelissen, of Great Queen-street. To make this gelatine sensitive to light it is soaked in three and a-half per cent. solution of potassium bichromate until it becomes flaccid; it is then laid on a piece of clean glass, and the excess of solution is removed by an application of the squeegee. The plate bearing the wet gelatine is then placed in a warm and photographically-dark place to dry, and when dry it can be easily separated from the glass by raising one corner with a penknife. We obtain in this way a flat sheet of sensitive gelatine having a smooth surface and all ready for exposure under the negative, and this exposure may last from ten to twenty minutes in sunshine, or a corresponding longer time in the shade.

I now take the exposed film and put it into water to soak, and you will perceive that those parts which were protected from the light begin to swell immediately, while the exposed parts refuse to swell in the water. The soaking should last several hours, but as we cannot spare that time I will take a gelatine which has already soaked the necessary time, and make a cast from that. For this purpose I lay the wet gelatine film on a piece of glass, exposed side upwards, and squeegee it down as before; you see that it adheres to the glass quite easily, and, after having made it surface-dry by dabbing with a soft cloth, a little oil is applied and distributed over the surface. Now that the excess of oil has been removed by a soft cloth I pour on plaster of Paris to a thickness of about an inch, taking care to remove any air-bubbles by the application of a camel's-hair brush through the liquid plaster.

Now, this plaster will take about ten minutes to become solid, so let us take another one which was cast just before the lecture, and which is now set. If we violently tear the plaster and the gelatine apart the fine details of the cast are almost sure to be damaged. But, instead of doing this, let us hold the glass plate in one hand and gently push the plaster cast with the other. Now you see that the gelatine is slowly sliding over the glass, and finally it will slide quite off, the plaster still being adherent to the gelatine. It is now merely necessary to turn up one corner of the gelatine film and slowly fold it back so as to draw it off the plaster gently and without fear of damage, either to the gelatine relief or the plaster, just as a lithographer draws a thin paper proof from the stone. The next step is to make a cast in stearine from the plaster, and for this purpose the plaster should be soaked in rather warm water about 50° Centigrade, and on this soaked and warm plaster, just as I have it here, a layer of stearine about an inch thick should be cast. Such a cast takes a long time to cool, so I have provided myself with one previously done. There it is; see how easily the stearine separates from the plaster. I now dust the stearine cast over with bronze powder, the best being a kind specially manufactured by Mr. Allen, of Mansfield-place, Kentish Town; and, this done, I put the cast into the electrotyping bath, and when a sufficient quantity of copper has been deposited it is merely necessary to back up with type metal and mount on a wood block, as in the case of this example, our work being then ready for the typographic press. If the process I have described is gone through with an ordinary half-tone negative an exceedingly beautiful electrotype is obtained, in which the gradations of light and shade are represented by varying degrees of relief. These, or even plaster casts, ought, I think, to have a very good sale if photographers would only take the matter up. The ease with which they can be made is surprising.

I may mention that, instead of taking a cast from the plaster in stearine, gutta-percha may be used, a press being employed to force the plaster cast—which should be in an iron chase—into the soft gutta-percha. Here is a cast, and here a piece of soft gutta-percha. I now put them into the press and apply pressure, and in a minute you will see what a good impression it is possible to get by this means. Of course electrotyping on the gutta-percha is very easy, but the examples on the table will illustrate the matter sufficiently.

The depth of the relief obtainable by the swelled gelatine process is about equal to that of an ordinary visiting card, and, where large surfaces of white occur, it is necessary to deepen the plate in these parts. This may be done either by cutting out the metal from the finished plate, or, in most cases, more conveniently by raising the surface of the mould, whether it be wax, stearine, or gutta-percha, on which the electrotypic copper is to be deposited. This is best done by holding a stick of stearine or wax in the left hand, and a warm pencil of metal in the other hand, and so holding the wax or stearine as to let a thin melted stream flow down the warm pencil. This stream is allowed to flow on those parts of the mould which require raising.

Most commercial phototypers content themselves with producing a very slight relief by photography proper, and they then deepen by hand-work. THOMAS BOLAS, F.C.S.

NOTES ON PASSING EVENTS.

BY A PERIPATETIC PHOTOGRAPHER.

I WAS once shown a photograph representing a piece of artillery while being fired, and in it the projectile was plainly visible while it was in the act of passing out of the mouth of the cannon. How was it done? will be asked. The *modus operandi* was simple, and it is brought to my recollection by reading in a recent number an article on *The True Action of a Horse in Trotting Determined by Electricity*. The camera in the case of the cannon was capped by a rotating disc, the rotation of which could be induced by the release of a catch by the operation of an electro-magnet. The moment this release was effected the disc was set in rapid rotation by the action of a powerful spring, the result being that the camera lens was uncapped for an infinitesimal portion of time. The release of the catch was effected by means of a wire stretched across the muzzle of the gun, which wire was in circuit with the battery, but, being cut by the emerging projectile when the gun was fired, it caused the electro-magnet to be so acted upon as to give the exposure at the instant when the ball or projectile was emerging from the muzzle of the gun. By adopting the same method the projectile might be photographed at any stage of its onward progress. The application of the electric principle to obtain accurate knowledge of the action of a horse's feet during trotting is useful and easily understood.

We all know, or should know, the influence of a supplementary exposure or pre-exposure to very weak light of a plate intended for negative purposes. It appears that the analogue of the advantages of thus treating negative films has been found to apply to sensitive printing paper. The conclusion arrived at by a writer in *Anthony's Photographic Bulletin* is that silvered paper, which has received a preliminary exposure to light, is very much more sensitive to feeble actinic rays than if it had not been so exposed. While such a discovery is of far less value than the analogous discovery of auxiliary exposures to negative plates, it cannot fail to interest greatly the student who inquires into the philosophy of photographic action. It may be, also, that the discovery will possess some practical value; but on this subject I shall defer all remark until I have had an opportunity of trying a few experiments in this direction.

The photographic dinner at Paris must have been a grand affair. Somehow or other they really *do* manage these things better in France. I often wonder, when reading of the social feeling that prevails in such cities as Paris and Edinburgh, why London is conspicuous by the absence of any such feeling. Is it because of its almost monstrous size that the photographic inhabitants of the great metropolis cannot, like their neighbours, devote a day or an evening to the cultivation of sociality? This can scarcely be the cause, nor, I imagine, will it be looked for in the great number of the members of the chief society, for in numerical strength Edinburgh is ahead of it. To what cause, then, is due the fact that the chief London photographic society can never manage to have either a day out or an evening out? Let us hope that London, which is always a little behind the times, will yet profit by the examples so well set by the Liverpool, Edinburgh, and other societies, and at no distant period proclaim to the world that social feeling is not quite dead.

Observing that in the case of Lombardi *v.* Vanderweyde, which was recently heard before Mr. Justice Field and a jury, the defendant said in the course of his evidence that the patent studio window out of which arose the dispute was a "great success," I am induced to ask can anyone inform me where such a window is to be seen? Having made inquiry among several friends I have not been so fortunate as to find one who can vouchsafe the information as to where I can see a studio fitted with the patent window. Had it been so successful as was hinted, is it not a little surprising that in London and its vicinity I have been unable to hear of one in active operation? I imagine this must arise from the fact that, while the window answers quite well for a single sitter, its action is only sound *in principle* when that sitter is placed at a definite point of the studio, while in the event of more than one sitter being taken it is quite unsuitable. If one were to concentrate a beam of solar light upon a definite spot by means of a burning glass, while the spot itself would be well illuminated by the converging solar rays the parts adjacent to that spot would be in comparative darkness, and this is, *in principle*, something similar to what happens when a sitter is posed in the focus of a number of rays transmitted at right angles to a number of panes of glass. I should like to see this subject discussed quite irrespective of its forming part of a patent, if the patent still exist.

(To be continued.)

PHOTOGRAPHY, PHILOSOPHY, AND CIVILISATION.

"In the calm summer gloaming" thoughts wander from beauteous scenes around to their causes; man's fancy is poetic, and the poet becomes a philosopher. Myriads of the human race have inquired—Can these scenes and glories ever be depicted? Will the Great Creator ever give the means of copying in some way the ever-changing scenes of forms, lights, and colours? With these objects before man, and his power of recollection to call up memories of bygone dates, it appeared that some chain existed between aspects of nature observed and the mechanism connected with our senses and reasonings. The poet revelled in recollections of scenic images; perhaps genius had its full triumph when, by its own creations and will, it could call up those pictures described by language and gesture with "fine frenzy" to impress others, as if all were true, until some of the world exercised their right to question as to the locality of the views, and received the never-to-be-forgotten reply—"in the mind's eye, my lord!"

So the world hoped on, until at last the announcement was made that it was believed light could and did take pictures of all around; that all substances through all time, with every ray of light, are affected; film after film of surface matter yields to the forces called into play when the rays of light are stopped. Then a modest philosopher prepared thin films of matter in the dark, hoping to secure one of the many pictures light is always making. The *camera obscura*—the dark box with a hole, or the tiny crack letting light into a dark room—showed the objects in the neighbourhood even with colours and motions. If he could get only one of these scenes drawn by Nature herself—a rock, a flower, or a landscape—he would have exalted hopes; and he succeeded! Niepce, in France, and Talbot, in England, by different means, showed pictures taken with pencils of light, and so photography arose, and was received by mankind with joy. Landscapes and portraits were produced—men felt their hopes had not been in vain—and they said then, and they say now—"Will Nature ever give transcripts of herself?" "Will she ever copy her own scenes with her own colours?" Photography soon enlisted the men of genius. The formal science of optics was then questioned as to light itself—whether it did travel through all space, particle after particle travelling with untold velocity to unknown distances in the universe. Were the colours red, blue, and yellow—all that could be said of the breaking up of white light? Some few keen observers had, however, perceived fine hairlike lines, and these were always to be seen, and with increasing numbers and grouping into dark bands, as better glass and more precise instruments were employed. So philosophical observers recognised these dark spaces in the light of the sun and the fixed stars, and in minerals and salts raised into vapours, and so spectroscopy has become a study, yielding to science and the arts great assistance and rewards. Mathematics has been called in to verify the past and to predict the future of experiments.

To the literary world the power of light has become so obedient that the very choicest stores of learning can be copied with a marvellous service—the choicest, priceless manuscripts and books copied with such exactness that the stains and ravages of time become matters of pictorial interest and truth; they can be copied, condensed, or enlarged, and transferred from one material to another. In the current literature of the day especially devoted to arts and manufactures, authors, artists, engravers, and publishers have a rare aid to pictorial illustrations. Take the book illustrations by wood engraving. The wood engraver, in a sort of Chinese fashion, would and could only follow the lines traced for him by a special artist on the wood block (who rarely cared about engraving his own work). This artist was hampered by having, perhaps, a crude sketch on the one hand, to be followed out by such lines as the engraver could cut. Now the block of wood may receive a photographic picture; and thus, having truth before them of faithful outlines, due proportions, and correct light and shade, both artists and engravers can shape their lines to suit the texture and their own art sympathies of expression.

Chemistry has been called in, and metal after metal has been employed until a solid block or sheet of metal enables the picture of a once delicate film of matter acted upon by light to be multiplied and worked with all the appliances of mechanical power. Thus far the publishers have this aid. In the fine arts its place has yet to be assigned, but photography as an aid to education will soon secure recognition wherever the English-speaking race prevails. It will aid teachers and learners by supplying grace, novelties, and pleasures. To those who cry out upon the housetops, "Of what good is it?"—"What will it do?"—the answer is that men of the very class of the inquirers, in every civilised clime, are found to make it a pursuit whereby they may live.

Politicians and students of history will ever have to recollect that in these days, when a city was beleaguered so that access to it was rendered impossible by a serried military host, science made messages of greatest importance upon minute films of collodion, and sent them in balloons, asking the newspaper press to publish them. Then messages—equal to a printed sheet of *The Times*—when so printed of microscopic dimensions, sealed in quills and attached to pigeons, were sent on their way to the outer world. Now, by captive balloons, by films on rollers that may be set in motion or stopped by electricity, a country with armies may be surveyed, or sandy, trackless deserts or icy regions may be depicted where man had never been able to explore. Thus much of this globe may be made out, and the valued lives of brave men may be spared. Probably no pursuit ever had such an army of amateurs, who, at vast pains and expense, repeat processes, and give their hints to the world.

The medical profession earnestly desire to know the physiological actions of light. They ask why do mankind "bask in the glare, or shun the noontide rays?" What are the wonderful powers of the retina? What is the structure to be impressed by light? Yet the mind and memory can recal some vivid scenes, and these can be reproduced at will. Some observers have noticed very peculiar fluids in the retina, which retire soon after death, and suggest that chemical pictures are formed. Some experimentalists suppose they have been able to catch and bottle up some of these wonderful picture-making fluids. Every thinking man will hail the hope that blindness, or imperfect vision or confusion of colour distinctions, may be treated with scientific skill.

The amateurs are advanced teachers of the public, and photographers may do well to consider how far the public has advanced in matters of taste. If the professional will fix the head as he pleases, take the portraits of such tints and such sizes as he dictates, mounts them in books, or displays them in sizes which the public feel as dictated forms, he must not be surprised if the public go forward to "fresh fields or fashions new." But the amateurs look up to select men who, by birth, education, wealth, and learning, command respect, and give more precision and confidence to science and arts to benefit the world. Lord Ross gave time, money, and rare mechanical skill to perfect instruments for astronomical purposes. Dr. De la Rue assisted the "eclipse expedition" by instruments and photographic aid at great expense. Lord Lindsay may be quoted as a quiet enthusiast in a distant part of the world selected for its fitness for a station to observe an eclipse—a cold, muddy, and uninhabited place. He found that the instrument for Professor Parry had met with accidents, and he endeavoured to apply some remedy, taking different pieces of apparatus to make a new instrument. One portion was to be a plain mirror. Lord Lindsay described the fear he had lest it was not a truly flat surface, and he found it was really curved—a curve with a radius of eight miles! Such are the men who volunteer their aid. Lord Rayleigh, too, with mathematics and experiments, has worked upon colours and spectra distinctions for years. The late Professor John Phillips sought to find enthusiastic young men, of the excelsior class, to scale mountains and fix their heights by readings of the barometer; but he very frankly confessed that the weight of every pound told upon the explorers. Since then the alpine clubs and ice-hammer-men, the canoeists and bicyclists, and many in other forms of exercise show skill and training; but we have work done by many hands in many climes, also, to show the union of physical endurance and chemical skill in obtaining photographic pictures.

Indeed, on the exactly opposite spot of the globe to us—in New Zealand—the "box" camera and glass have been dragged to the top of the burning mountains, deemed sacred by the natives, who have been awed by the powers of the box; and those who saw the portraits of Hottentots taken with Kennett's dry plates would think that the savage could recognise the fidelity of every hair and foldings of the skin. But there are others besides the savage to be taught. In the travels of Anacharchus we are told of a Turk who would be too meddlesome, and was asked to state what he could see in the camera. He saw there the figure of an obnoxious person walking about. The Turk was then confidentially informed that people could be put into the box, and be kept there, but if he would take himself off the instrument should be pointed in another direction. He took the hint. Such impressive exhibitions must greatly affect the minds of those who usually follow the dictates of mercenary forces.

That the wealthy and refined classes quietly aid photography occasionally is shown by Mr. Crawshay, by medals, money, and examples to get large pictures. Piazzi Smyth, on the contrary, advocates gem-like small pictures, to be afterwards enlarged. The camera, too, besides a motive for travelling, affords the opportunity of companionship—in some pictures in far distant lands the lone figure may be "the dearer self, the partner for life," who has done the share of skilful packing, so that, whether by land or sea, or by mule or vicious dromedary, not a single glass was broken from England to Jericho and return in an eight months' journey! Mrs. Brassey, in her narrative of a voyage round the world in the yacht *The Sunbeam*, says that the party ascended the famed mountain for the Peak of Teneriffe and at about 8,000 feet above the sea she saw an overhanging ledge of rock which would offer rest and shelter from the sun, and, while the bulk of the party went on, she put her camera into use, taking memorable pictures of the visit; so there can be no doubt that photography will be welcomed by many wealthy tourists as being a true companion.

The caverns of the deep will soon be explored, and light will shine in the valleys of deep waters; will point to the dangerous rocks to shun; or how to follow a safe track if mists, darkness, and fog obscure the mariner's sky. The magnesium light and the electric light will blaze out if the sun at Stratford-le-Bow does not shine through fog and murky air; and as in the evening sky we seem to find islands in a golden sea of light, so our thoughts have a grateful feeling for the obvious union of photography, philosophy, and civilisation, and we rejoice in such reveries in "gloaming time." THOMAS J. PEARSALL, F.C.S.

THE BIG SHOW.

THE LAST DAY.—SIGHTS OF PARIS.—HOME.

FROM a photographic point of view most of our time was taken up with the French, English, and American departments, so that we had to hurry through the Italian, Russian, Austrian, and other classes of photographs shown, all of which indicated fair advancement in the various branches of the art-science. But as has been mentioned before, for comfort, convenience, and pleasure, recommend me to an exhibition of photographs where the pictures from the various countries adjoin each other, instead of being, as they are here, scattered all over the place; for as much time is lost in seeking for and finding them as could be well employed looking over the pictures three or four times.

A visit to Paris being to us a marked day in our lives, we bid farewell to the Exhibition with all its charms, and came away into the city to see the heaped-up wonders of the French capital, where all is show—show—an everlasting show.

In our sight-seeing tour we choose the churches first, and as most prominent amongst these we go to the Cathedral Church of Notre Dame, at the doors of which are sold photographs, lithographs, and charms. Like any other show we pay our money, get tickets, and enter. As you enter an old man presents a brush—the latter looking as old and worn out as himself—for those to touch whose faith it is. We walk down the aisles, where the coloured light from the stained-glass windows falls soft and subdued, seeming to bring a silence with it, for not a sound is heard save the muffled footsteps of the visitors. Here and there, in the centre of the church, are bending worshippers, still and motionless. Passing these we are ushered into a series of rooms on the right, where in a voluble manner our guide describes to us the ups and downs to be found even in the lives of monarchs, and the ebb and flow of a country's tide, illustrated by *souvenirs* of the past gathered and safely stored within these walls. Brilliants and other precious stones, robes and vestments of every varied kind, and each with a story of its own—from the emperor's jewelled cloak to the bespattered garb of the murdered priest.

Then away up into the towers we go; and as we gaze upon that massive bell, in fancy we can see it go swinging through the air—in fancy we can hear its mighty tones—and, as it quickly moves, behold upon its side clings Victor Hugo's dwarf, chuckling and yelling in fiendish enjoyment as backward and forward he floats on through the midnight air; and so, as here we stand, in our fancies Esmeralda lives with us again. We visited many churches, and all of them possessed great treasures in the form of artistic windows, masterpieces of statuary, and beautiful paintings on the roofs and walls, the inspection of which will well repay the visit of the stranger.

Our next visit was to the Louvre, where are to be seen the works of Rubens and Vandyck, Veronese and Murillo, and hundreds of other pictures by men whose names are synonymous with all that is grand in the fields of artistic conception. The museums of the Louvre (free from the picture galleries) are of such dimensions and contain such a collection of subjects of interest that it would take weeks to do them anything like justice, so that the visitor who is limited for time can but walk through. But Paris is great in museums besides this one, and of the many we visited the Hotel de Cluny and the Palace of the Luxembourg.

We next went to see the manufactory of Gobelius tapestry, situated in the Faubourg St. Marcel, on the Bièvre. It is stated that the water of this stream is as favourable to the process of dyeing as Burton water is for the making of beer. Gobelins originally were but wool dyers, the manufacture of the world-renowned tapestry being taken up by Canayes, their successors. To see this tapestry being made is one of the sights of Paris that should not be missed. We saw the tomb of Napoleon, the Invalides, the Pantheon, and the Palace of Justice.

Next we visit the Bourse, and are conducted to the gallery where we can look down upon the collected producers of those sounds which make us think that we must have got into a pandemonium. Oh! if it were possible to photograph sound what a marvellous picture this wild and ceaseless din would make! The objects below that produce it seem to run up and down, shrug their shoulders, wring their hands, and tear their hair. Surely it is the rehearsal of a burlesque! Oh, no! it is all sobriety and earnestness. This is the Exchange, and the performers are quietly doing their daily work.

In the Boulevard Capucines there is a hall in which phonographic *séances* are given five or six times a day. To visit this phonographic exhibition is time well spent; for, although it does not come up to the descriptions of it given in the daily press, where they state that speech is preserved in all its original purity and fulness, still speech and song are preserved, and can be reproduced quite plain enough to be understood by any one in the hall. As a scientific instrument it is a marvel. We heard a solo on the cornet, and one on the French horn. Speeches and songs it spoke and sang again, but it lacks the full tone. It has more the sound, in reproducing, of a ventriloquist, when speaking from a distance, than the full tones sent into the speaking tube. This, they say, will shortly be improved; but, even in its imperfect state, go and see it.

Having run over a few of the most prominent features of the great show that attracted my attention when visiting it, I have done so more especially for the benefit of those who, like myself, hail from the country, and are apt to be angular in steering their course amongst the busy crowd.

And now, as I gather my luggage together on the railway platform of our little town, I must bid you "Good bye." MARK OUTE.

FOREIGN NOTES AND NEWS.

DR. RICHARD ON POTASSIC SULPHIDE AS AN INTENSIFIER.—DEATH OF DR. WEISSENBORN.—A METHOD OF FREEZING OR COOLING MIXTURES.—UTILISING OLD AND UNUSABLE COLLODION.

IN the *Archiv* Dr. Richard, of Mänendorf, speaks of potassic sulphide as an intensifier. When used freshly-prepared with negatives not likely to require to be long kept (as in such a case the silver sulphide would become decomposed) he maintains it to shine as a quick and reliable intensifier, and that if the laboratory or dark room be lofty enough and sufficiently well ventilated, and if proper provision be made for its escape, the gaseous hydric sulphate thrown off need not be so hurtful to the operator as most people would reasonably expect.

The potassic sulphide intensifier should be used rather weak at first for fear of causing spottiness in the action, and the following is the solution recommended by Dr. Richard:—"Place a piece of potassic sulphide not larger than a hazel nut in a developing glass, and fill the glass with water. Commence at once to intensify by pouring some of the contents of the glass over the plate and then back into the glass. As the lump of potassic sulphide dissolves the intensifier will gradually become stronger and the intensification will proceed with a correspondingly increased rapidity. It is indispensable that the negative be intensified with pyrogallic acid before being fixed, and that it be well washed after fixing. Thus the intensification with potassic sulphide takes place in the usual order in the picture-producing process. The negative acquires, in the course of its second intensification with potassic sulphide, a purplish-brown colour, which may be increased at will to any density." Dr. Richard concludes by saying he thinks this method preferable to the mercuric chloride and ammonia intensifier, to Dr. Eder's lead intensifier, and to the mercuric iodide intensifier.

The *Photographisches Wochenblatt* gives the following formulæ for cold mixtures, consisting either of snow or ice and chemicals, or of chemicals alone, which may be of use this exceptionally warm summer:—

I.—*Mixtures of ice and chemicals.*

		Temperature.
1.		
Snow or ice broken in pieces	1 part.	15° C.
Chloride of sodium (common salt)	1 ,,	
2.		
Snow or ice	1 part.	11 to 12°.
Chloride of sodium (common salt)	2 parts.	
Sal ammonia	1 part.	
3.		
Snow or ice	24 parts.	6·66°.
Chloride of sodium	10 ,,	
,, ammonium	5 ,,	
Potassic nitrate	5 ,,	
4		
Snow or ice	10 parts.	4°.
Chloride of ammonium	5 ,,	
Nitrate ,,	5 ,,	

II.—*Chemicals only.*

1.		
Water	16 parts.	12°.
Chloride of ammonium	5 ,,	
Nitrate of potassium	5 ,,	
2.		
Water	1 part.	14°.
Nitrate of ammonium	1 ,,	
Carbonate of sodium	1 ,,	
3.		
Water	1 part.	15·5°.
Nitrate of ammonium	1 ,,	
4.		
Sulphate of sodium	3 parts.	16°.
Nitrous acid	2 ,,	

In the *Mittheilungen* the death of Dr. Weissenborn, at the age of 42, is mentioned. The deceased gentleman took a lively interest in photo-chemical matters—in connection with which his name may be familiar to some of our readers.

In the same journal Dr. Vogel says:—"Many photographers have a habit of adding fresh collodion to an old collodion that has become red, and then using the mixture to the deterioration of their silver bath and the decrease of the sensitiveness of the plates. Others use their old collodions for clearing, a purpose for which it is far inferior to ammonia. It does not pay to use the ether and alcohol distilled off as a burning material, as it always contains acetic acid, and fills up the wick of the lamp. The method now recommended for employing old collodion should therefore be very welcome. I use it up instead of alcohol in the *developer*. When the ferrous sulphate is dissolved in water with a little acid I add, instead of alcohol, the same quantity of old collodion. The cotton is then thrown off and filtered off. The small quantity of iodising salt which is thus added to the developer does not do the least harm."

THE ECLIPSE OF THE SUN.

In connection with the eclipse of the sun, which took place on Monday last, the 29th ult., the services of photography, as usual on such occasions, were largely utilised. The special correspondent of the *Daily News*, writing from Rawlings, Wyoming, says:—

The eclipse has been most satisfactorily observed at all the northern stations, and at all the southern ones, from which news has been received up to the present time.

The corona was markedly different from those observed in 1869, 1870, and 1871, and this year the observations have demonstrated the great variation in the structure and condition of the sun's outer atmosphere when there are most and fewest spots on his disc. The corona was small, of a pearly lustre, and the indications of definite structure were limited to two portions. Several long rays were seen, and Professor Newcomb, who had created a screen on a high pole, thinks he detected the zodiacal light extending six degrees from the sun. Professor Draper, who used a Rutherfurd grating two inches square and a camera of large aperture, and Mr. Lockyer, who placed a small grating in front of an ordinary portrait camera, both obtained photographs of the spectrum of the corona. A continuous spectrum only was recorded, and in ordinary spectroscopes the bright lines usually seen were altogether absent. Mr. Lockyer, who observed with a simple grating, saw no rings.

All these are so many indications of a wonderful change since 1871, and there is great probability that the substance which gives rise to the continuous spectrum is not that which produces any of the lines.

Professor Newcomb's party and Professor Barker made a careful search for the dark lines in the corona, but none were observed. Professor Young has telegraphed that there were no lines observed in the ultra violet at Denver. It would appear, therefore, that he also has obtained photographic evidence of a continuous spectrum. The radial polarisation observed in 1871 has been confirmed by Professor Holden.

A new use of the eclipse has been introduced on this occasion. Professors Newcomb, Watson, Holden, and others have included a search for intramercurial planets in their programme, and Professor Watson has been fortunate enough to detect a body of four and a-half magnitude near the sun, which certainly is neither a known star nor a planet.

Every facility has been afforded to the astronomers, and a fourth station along the northern line crossing the belt of totality was at the last moment organised by the Union Pacific travelling photographic car being run to a point between the eclipse camps at Separation and Preston.

The tasimeter, the new instrument on which Professor Edison has been working unceasingly here, has proved its delicacy. During the eclipse he attached Thomson's galvanometer, the index being set to zero, when the telescope carrying the tasimeter was pointed several degress from the sun. The point of light rapidly left the scale, when the corona was brought upon the fine slit by which the tasimeter itself was protected. There was no chromosphere to speak of, and only one prominence, like the horn observed in 1868, but very dim.

Through Reuter's Agency we have the following from Denver, Colorado:—

The astronomers assembled to watch the total eclipse of the sun visible today succeeded in taking most satisfactory observations, drawings, and photographs along the line of totality. The corona was unusually bright, extending 70,000 miles from the sun in all directions. The chromosphere appeared to be about 2,000 (?) miles in depth. Two protuberances only were seen, very faintly visible on the western side of the moon. There was an entire absence of the pinkish red flames observed on some previous occasions, and the spectroscope revealed no extra red or violet lines. At the moment of totality the Fraunhofer lines and both the H lines were reversed.

Very bright lines near large B, and also bright lines F and 1474 Kirchoff, were observed. The temperature fell from 18 to 33 degrees in different localities during the eclipse. No intermercurial planet was observed. The weather was perfect.

Professor Norman Lockyer reports that the solar protuberances were fainter and fewer, but that the corona was ten times brighter than in the eclipse of 1871, thus indicating a variation with the maximum and minimum sun-spot periods.

The New York correspondent of the *Daily News*, writing under date July 20, gives the following interesting description of former eclipses of the sun:—

Captain Parsell brought among his passengers in the good ship Baltic, which arrived at New York yesterday, the last of the contingent of European observers of the approaching eclipse, and as the arrangements of the peaceful campaign are now nearly completed, your readers, or, at all events, some of them, may be glad to know something of the work to be done, and how and where it is proposed to do it. It must be borne in mind, however, that the Atlantic is not yet so perfectly bridged as to avoid all danger of the results secured by the astronomers reaching you by telegram before you get this letter.

We have first to consider the various problems which the astronomers have to solve, and the methods they propose to bring to bear—methods which, although they have cost months to prepare, can only be utilised for the short space of 183 seconds at the outside till another eclipse darkens the land. Although work connected with the physics of the sun forms part of the daily routine of observatories in all civilised countries, it is very convenient to consider the advances which have been lately made and the points which await solution in connection with the eclipses which have happened since 1860. It was in that year that the first results achieved by the spectroscope dealing with the constitution of the sun became generally known. The idea that the sun was a cool, habitable globe received its deathblow; it was made certain that it was a globe so hot that the vapour of iron and other metals played exactly the same part in its atmosphere as the vapour of water does in our own. The photographs of this eclipse put beyond all doubt that many of the coloured appearances observed in solar eclipses round the dark body of the moon were really at the sun, not round the moon, as had been previously suggested. Whether this region, then, represented the true atmosphere of the sun was a point of extreme interest, and the determination of its chemical nature became a matter of the first order of importance. Nothing, perhaps, can show the want of receptivity on the part of men of science more than the fact that there was no spectroscope employed by any of the observers of the eclipse of 1860—a neglect which retarded the solution of one of the principal problems nearly for a decade.

It will be well to enter a very little into detail before we refer to the next eclipse on the register—that of 1868. The objects round the dark moon, which had been proved in 1860 to be partly at the sun, are first an irregular ring of exquisite pearly lustre, crossed by radiating lines, which give it the appearance of a decoration or stars; this is the glory or corona. Next here and there close to the moon coloured and much brighter objects called flames or prominences. These are generally, but not always, red; they may be yellow or violet. Now, the brilliant achievement of the eclipse of 1868 was the determination that these prominences were masses of incandescent—*i.e.*, glowing gas; and it was not very long before it was conclusively demonstrated that the gas was hydrogen. The eclipse of 1868 was observed in India. It was next the turn, as it is now, of America. During the eclipse of 1869 which swept over the United States, not only was the base of the corona photographed as the prominences had been in 1860, but its spectrum was observed with the greatest care, and it also was determined to be gaseous like the prominences, the gas, however, not being the same. So much for the base of the corona. The exterior portions, including rays a degree or so long sometimes seen, were still left *sub judice*.

The next eclipse happened next year, that is in 1870, and English expeditions were sent to Sicily, Spain, and Africa to observe it. The weather was bad at many of the stations, and the work was considerably interrupted; some of the American observations of 1869 were, however, carried further, and the existence of hydrogen above the prominences was demonstrated. The same differences between the "photolytic" and the visible corona were recorded as in the American eclipse of the previous year. In addition to much knowledge gained by the spectroscope and polariscope, the general result of this eclipse was to endorse the opinions expressed by the Astronomer Royal and Professor Mädler after the eclipse of 1860, namely, that the appearance called the corona was due to a complex cause. Part of it was certainly solar, as it was seen both before and after totality, as well as during the eclipse itself; part of it was as certainly due to some cause at work, not at the sun, but rather partly in our eyes and partly in the regions of space between us and the moon. It may be here remarked, *en passant*, that the appearance of the rays seen (not photographed, and this is an important distinction) in the corona are exactly similar to those which may be seen by anyone who will watch from one end of the platform of the Metropolitan Railway Station at Baker-street the solar rays piercing the smoke.

Here we are dealing with a period rich in eclipses, for again the next eclipse happened next year and in India. The British Association, the French Academy, and the Indian Government had observing parties out there, and records were secured of extreme value, because the eclipse happened at a period of maximum sun spots—that is, at a period when there are most spots on the sun, and other evidences of the maximum of activity, the ebb and flow of this activity spreading over a period of eleven years, so that the next similar occasion will occur in 1882. Owing partly perhaps to this increased activity, the hydrogen was discovered to extend beyond the photosphere of the sun to a height about equal to one-third of the sun's diameter—that is, to a height of 250,000 miles, or thereabouts. The corona was photographed better and to a greater height than it had ever been before with certainty; the difference between the photographic and the visible corona came out as strongly as ever, and the structure of the corona was minutely examined with a powerful telescope. It was found to be identical with that of the prominences, and the non-solar origin of the radial structure was conclusively established. At the same time, the brightest lines in the spectrum of the corona and prominences were carefully recorded by a novel method, the corona itself being made to replace the slit of an ordinary spectroscope. Not till 1875 were photographs of the spectrum of the corona and protuberances secured. This eclipse, the last utilised, was observed in Siam by an English government expedition, and by Dr. Janssen, on behalf of the French Academy of Sciences. A new field of inquiry was opened up by these photographs, for it was found that the actinic region of the spectrum contained marked lines, the exact position of which, however, could not be ascertained. Some photographs of the corona were also secured with various lengths of exposure, and the solar portion was found, as it had already been—especially in 1871—to be symmetrically situated with reference to the sun's axis of rotation.

So stands the problem now, then. All the points referred to are so many stepping-stones to a knowledge of the changing energies of the sun, and of the manner in which they manifest themselves in the atmosphere of our central luminary. It will be clear that there is here a rich crop of pure knowledge to be gained; but there is something more. The more the energies of our own atmosphere are studied the more closely are they found to correspond with solar changes, and our solar astronomers, whether they know it or not, are really recording meteorological facts, which, in the coming time, will bear rich practical fruit. There is little doubt that attempts will be made to render our information more complete along all the lines already indicated. One of the most interesting among the methods to be employed will be the application of diffraction gratings to this kind of work. There is only space here to say that in this case we have a spectrum produced by the light falling upon a finely-ruled surface—17,300 lines to the inch—instead of by its passage through a prism—the mode ordinarily employed. Several new instruments have been constructed in which the attempt to photograph the spectrum thus obtained will be varied. If anyone succeed, the question raised by the Siam eclipse will be settled.

We next come to the region from which the eclipse will be observed. The eclipse of the present year may be regarded as the return of that of 1860, which was made memorable by the expedition which left England for Spain under the guidance of the Astronomer Royal in the *Himalaya*. In 1860 the eclipse swept over the Hudson Bay Territory, the North Atlantic, and then struck Spain and Africa. This year the shadow path first strikes Siberia, goes north-east, then east, tends south-easterly as it leaves Asia, and falls on British America. In the United States, where the stations are more accessible than in the regions we have named, it first follows the western slopes of the Rocky Mountains, then passes over Texas on its way to the Gulf of Mexico and Cuba. The wonderful Yellowstone National Park is in all probability the most northerly station that will be occupied. The advantage of the northerly stations being that the sun is higher and the totality longer; in the Park, for instance, the sun will be 49 deg. high, and the totality will last three minutes and a few seconds. The next most convenient station, so far as railways are concerned, is near Sherman, on the Union Pacific line, and the highest point on it (over 8,000 feet) a little to the west of the Laramie plains. To the south, the line which runs from Cheyenne, on the Union Pacific, through Denver and Colorado Springs to Pueblo, cuts the eclipse track to the north of Denver; and there is little doubt that taking all in all, we have here the most convenient observing ground, choice of almost any altitude, from Pike's Peak (14,147 feet) and Long's Peak (14,271 feet), which is almost exactly on the central line to Denver (5,197 feet) on the junction line, where the ocean-like prairie beats on the bases of the outliers of the mountain range. At Pueblo, the most southerly station we have named, the locality is reduced to two minutes forty-seven seconds—167 seconds in eclipse language. There are few things connected with the recent progress of the United States more remarkable than the ease with which these regions can be reached. Four days' and nights' travel in a Pulman car is all that is required nowadays to make the railway journey from New York, or any port on the Eastern seaboard, to any of the places on the north and south line joining Cheyenne and Pueblo, to which reference has already been made; and indeed no better instance of the perfection to which travel has been brought need be quoted than the fact that London is now only fourteen days from the Rocky Mountains, and that the journey can be made with next to no fatigue, and next to no risk. To such an extent does modern civilisation profit by ten thousand peaceful victories of science. Risk and emotion, however, are not the same thing, and the words must not be confounded. There is emotion connected with a summer voyage to America. The fog that will not lift; the sun and stars that will not be observed; the complicated throbbing of the iron heart; the ice which will not be content to anchor itself in the polar regions, but floats across the well-beaten ocean track to be dissipated by the breezes of the sunny south. All these strain man's powers to the uttermost to abolish risk, but he does it—at least some men do, and all may.

We come finally to the actual distribution and *personnel* of the various parties, so far as these are known. Most of them are already at the front, and are to be congratulated upon having missed the present torrid temperature of the central plain and eastern seaboard—St. Louis with its forty cases of sunstroke in a single day, and New York with a climate like Calcutta, and next to none of the Calcutta precautions against over-exposure. There are going to Rawlings, a station on the Union Pacific Railway, in Wyoming Territory, two regular parties from the Naval Observatory—one under Professor Newcomb, which Mr. Lockyer will probably join, and one under Professor Harkness. Professor Newcomb will make enlarged photographs of the corona, by means of one of the photo-heliographs used in photographing the transit of Venus in December, 1874. Professor Harkness will use a direct image photographic instrument with the same intention; he will also make spectroscopic observations, and, perhaps, observations for determining the heat of the corona. There are about four or five observers in each of these parties. Both will be near Rawlings. Mr. Trouvelot and his son will also go to some place near Rawlings for the purpose of making a drawing of the corona during the total eclipse. Professor Langley, of Pittsburg, will go to Pike's Peak for the purpose of studying the structure of the corona during the totality. There will also be at Pike's Peak General Myer, the director of the Signal Office, and Professor Abbe. Professor Holden, of the Naval Observatory, will go to Central City, near Denver, to observe contacts and make polariscopic observations. There will also be three of the Fathers Sestini (of Georgetown, D.C.), near Central City, and Mr. George W. Hill, of the *Nautical Almanac* office, will observe the corona from one of the high peaks near Central City. Professor Hall (Naval Observatory) will go to Las Animas, in South Eastern Colorado, and will make photographs of the corona, with a direct photographic objective; there will also be polariscopic observations made there of the light of the corona. The contacts will be observed, and it is intended also to make a drawing of the corona. Professor Eastman will go to the same vicinity, and he will make polariscopic observations and also drawings of the corona. Professor Hall's and Professor's Eastman's parties each contain four or five observers. Mr. D. B. Todd has been sent to Texas, and will make arrangements there with observers who may live near the limits of total eclipse for the purpose of observing the duration of totality in order to fix the position of total eclipse. These are all the Government parties that are sent out, unless, perhaps, Professor Watson, of Ann Arbor, may go. Some observers in nearly all the Government parties will make a careful search for intra-mercurial planets during the time of totality, which is about three minutes. Professor Young, of Princeton College, has a large party also among the mountains to the west of Denver. Mr. Ranyard accompanies him. Professors Eastman and Holden, with their parties, left some little time ago. The other parties from the Observatory, Professors Newcomb, Hall, and Harkness, left on Tuesday. The route to Rawlings is through Chicago, Omaha, and Cheyenne. To Colorado is generally by the way of Pittsburg, St. Louis, and over the Kansas roads to Denver. Professor Wright, who goes to Las Animas with Professor Hall, will leave Newhaven about the 20th of July. Professor Thorpe and Dr. Schuster have joined his party.

From the statistics at the Signal Office the chances for good weather on the day of the eclipse are about eighty per cent. in Wyoming and in South-Eastern Colorada, near Las Animas. Nearer the mountains in Colorada, as at Denver and Colorada Springs, the chances are only about fifty per cent. The railroad car containing all the instruments of the Government parties left Washington on July 2, and reached Omaha July 8. After the eclipse all the parties will meet at Denver.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 5	West Riding of Yorkshire	Oddfellows' Hall, Bradford.
„ 7	Edinburgh	Hall, 5, St. Andrew-square.
„ 7	Bristol and W. of Eng. Amateur	Museum, Queen's-road.
„ 7	Photographers' Benevolent	160a, Aldersgate-street.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The July outdoor meeting of this Association took place on the afternoon of the 25th ult. Permission had been kindly granted by Miss Watt to the members to photograph in her grounds at Speke Hall. Had it not been for the unavoidable short notice of the meeting no doubt a larger number of members would have attended. As it was about sixteen met at the rendezvous; but a downpour of rain and a leaden sky, which gave but little promise of breaking up, so disheartened one or two that they declined going. Mr. Councillor Forrest, who was unable to go, observing the disappointed looks, generously offered a prize for the best negative taken that day.

The party started at 1.30 p.m., in a waggonette, and had gone but a short distance when the rain came down so heavily that one or two more desertions took place as a passing omnibus or friendly shelter offered. A consultation was held as to whether the excursion should be abandoned, as, from the appearance of the sky, no signs of the rain ceasing could be observed. One of the members would not hear of turning back, expressing his wish to proceed if only to have the pleasure of competing for Mr. Forrest's prize. Owing to his enthusiasm the others rallied round his *banner*, and the waggonette proceeded onwards. Jokes were passed freely in order to revive their drooping spirits, which the Secretary did his best to depress by stating that he was afraid they would not be allowed to photograph, as he had only asked permission to go to the Hall on "a suitable day," and it was announced that though all had intended to use *dry* plates every one would be obliged to work *wet*, and that india-rubber coatings were only allowed on the *h*edges. The proverb "None but the brave deserve the fair" was verified, as before the cameras could be unpacked it became fair; and, although there was no sun, the light was such that several views were taken where in sunshine the exposure would have been difficult. Speke Hall is a very fine specimen of the black-and-white timbered Lancashire manor house of the time of Elizabeth, bearing over the porch the date 1598. The light was not strong enough to take any views of the interior courtyard, in which are two flourishing yew trees, but about thirty-two plates were exposed on the exterior.

The party afterwards drove to the Old Hut, another specimen of the timbered black-and-white—now a farm house, but formerly the gatehouse of the ancestors of the Ireland family of Hale. Here a few plates were exposed, and the members then went on to the residence of Mr. E. Twigge, of Halewood, who had kindly invited them to join him in what proved to be a most enjoyable and substantial tea, which, no doubt, counteracted any ill effects of the previous wetting.

No formal business was transacted afterwards beyond reading the minutes of the last meeting, which were confirmed, and, after spending some time in the garden, and viewing some of Mr. Twigge's photographic treasures, the members started homewards, having, notwithstanding the miserable weather at the outset, heartily enjoyed a very pleasant afternoon.

The resulting negatives are understood to have been very successful.

It is expected that arrangements will be made for another outdoor meeting about the end of August.

Correspondence.

AMATEUR PORTRAITURE BY THE LIGHT THROUGH A PARLOUR WINDOW.

To the Editors.

Gentlemen,—In reference to this subject, treated so ably last week by yourselves, and this week by your very able contributor, Mr. W. B. Bolton, I will mention just one point, having experimented a little in this direction, both with wet and dry plates.

My last experiment was made nearly two years ago with a gelatine plate, under these conditions:—In my apartment in London, the landlady being the sitter, the sun shining directly through the window, I placed the sitter near the window, just so far back that the direct rays could not fall to dazzle her; but passing her they were received by my screen, a white sheet, and reflected on to her. I believed I could get sufficient light by this arrangement, when without the sun I could not do so. The result appeared to me quite satisfactory; but I left the negative with the landlady, and have never seen a print from it.

Over Mr. Bolton's light wooden frame I think I should paste some paper, of such a kind as would reflect more light than a sheet can do. A screen on a clothes horse answers well for throwing a sheet over.—I am, yours, &c., Wm. Washam.

Eastbourne, July 29, 1878.

LOMBARDI *VERSUS* VANDERWEYDE.

To the Editors.

Gentlemen,—To your report of this very complicated inquiry I would only venture to add the following:—It should be understood that the case had been already adversely criticised by the judge in chambers. I was resolved, however, to have an investigation into all the particulars at issue between the complainant and myself through the only course open to me—a searching cross-examination of us both before a jury. Unfortunately for my case I had no opportunity or sufficient time allowed me to communicate with the counsel engaged for me.

Now, having all along held that my two letters in reply to the same letter addressed to me by the two parties engaged by my opponent, at short intervals, were one and the same, my holding to this opinion in court led to the extraordinary misconception on the part of my advocate which brought the investigation to so unsatisfactory a termination.—I am, yours, &c., Henry Vanderweyde.

182, *Regent-street, July* 30, 1878.

INTENSITY IN GELATINE PLATES.

To the Editors.

Gentlemen,—I notice there are again several questions respecting the thinness of the negative image obtained from gelatine plates, and the means of obtaining more intense negatives.

I scrupled very much, at first, to begin working with gelatine, because I felt the images were much thinner than I should like them to be in order to obtain the results I desire in printing. At the same time, the superior sensitiveness seemed to me very desirable for certain purposes, such as photographing interiors. It was at this stage that I thought of the advantages which a second film—one of collodion—superimposed might confer. Later on, the results obtained by the use of a certain proportion of beer in the solution of the sensitised pellicle were made known by Mr. R. Kennett and the Rev. H. J. Palmer. This I looked upon as the salvation of the gelatine process. Under the ægis of the former gentleman it had indeed already been fighting a good fight; but I felt then that it was about to become a great commercial reality. The great convenience of the dried pellicle, and the readiness of Mr. Kennett at all times kindly to demonstrate and explain to those who were in difficulty, I think must have been the means of setting many to work with gelatine.

Before beginning, myself, I had seen Mr. Kennett develope a plate. One thing struck me as a cardinal point, and I have since found that whenever I have taken the precaution to use a certain proportion of beer in emulsifying the pellicle and have rightly exposed—not too short a time—my obtaining an image too thin or not depends mainly on my attention to that point. I saw a right idea of the progress of development could not be obtained by examining by transmitted light, as with ordinary emulsion plates, but only by reflected light. When the developer was on portions of the film began presently to darken, as in any other development. When this darkening had spread so far that I thought the plate must now be fixed—nearly the whole plate being darkened—the developer was perseveringly kept on the plate, and finally one drop more of the ammonia added. As the last traces of the lighter portions had disappeared—if my impression be right—or were just about to disappear, the developer was washed off and the negative fixed. That, I say, is the impression which has remained with me, and I have found that just that last operation makes the difference between a thin negative and one of printing, or nearly printing, intensity. My patience is sometimes, if the negative have been a little under-exposed, nearly exhausted, and am tempted to omit it. This was the case in the last gelatine plate which I had exposed as a trial plate in Gibraltar. The consequence was a thin negative. Foliage in foreground, buildings, the sea beyond, the hills, and floating clouds in the sky (I always use a backing)—all are there in proper gradation. My negatives have since been packed away; but I think that when I can work at them again I shall find this, which is from one of Kennett's plates, will intensify to printing density.

I rarely find a difficulty in this respect, whether working with plates prepared from the pellicle sent to me by Mr. Kennett or with plates prepared by himself. I believe that, in most cases, with the formula sent out with the plates and the pellicle I would intensify to opacity. In my first trials, having obtained negatives that most photographers would consider sufficiently intense, I experimented further, and the result has been that the first negative I can only print through in direct sunlight, and the second I cannot print through at all.

I have not yet experimented with any of the gelatine plates which have since appeared in the market, so that I cannot, of course, say how far the same principles apply to them. I shall hope to experiment with others as opportunities arise, having a packet by me with that object at the present time.—I am, yours, &c., WM. WASHAM.

Eastbourne, July 29, 1878.

P.S.—The intensification ought by no means to take place immediately after the development and fixing. By the time the last stage of the development has been completed the film must have been softened almost, or quite, through; and if the plate be kept longer wet I should fear reticulation of the film would commence. One is also better able afterwards to judge of the amount of intensification required.—W. W.

ANSWERS TO CORRESPONDENTS.

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

*** We are compelled to leave over several reviews, critical notices, exchanges, and photographs registered till next week.

E. P.—"Exchange" notices are not repeated unless paid for as advertisements.

NUMBER TEN.—Yes; for printing upon opal glass it is good. This is all that we are enabled to say from our own experience.

"LUMINOUS" (Edinburgh).—The windows must be extended. The lighting of the studio, as shown on the plan, will not be good.

AQUILA.—The *carte* is of a high class, and if this be an average sample of your work you will be quite qualified for the situation.

"TONALD."—We have never recommended an acid toning bath for albumenised paper prints; on the contrary, we have always enjoined the use of the alkaline bath.

"ANXIOUS."—Place gelatine in water until swollen, pour off the water, and add methylated alcohol, applying a degree of heat sufficient to melt the gelatine.

V. A. V.—Fogging may arise from several conditions, to none of which have you given any clue. Unless you send us more particulars we cannot impart the desired information.

G. B. DOUGLAS.—Get the names engraved on the sides of the bottles by the recently-introduced sand-blast process. This will not cost a tenth of the price of hydrofluoric acid.

R. D. B.—You are in error; the raising of your glass house is not a subject of interest to our readers. If you wish for advice on the subject send a plan, showing full details, to the Editors.

W. L. R.—Let us know the method which you tried without success, and before our next issue we will have found a formula which was published eight or ten years ago, and by which good results were obtained.

E. K.—Make a strong solution of cyanide of potassium of good quality, and dissolve in it a small quantity of iodine, the proportions not being of any consequence. Apply this to the silver stains on the linen, and they will disappear.

B. P. P. R.—Do not allow the strength of the hyposulphite of soda bath to be less than six ounces to the pint. Under some circumstances it may exceed this strength; for example, when the paper is a thick or strongly-albumenised sample.

SPES.—From the symptoms indicated we should have thought the silver bath was less than half the strength you imagine it to be. Do not forget that the hydrometer is not an accurate test for the strength of a silver bath after it has been in use for some time. The volumetric test is the only one upon which implicit reliance can be placed. But we do not think the precise degree of strength is of any consequence in this case; of far more importance appears to be the condition of the bath with respect to alkalinity or acidity.

J. FAVERHAM.—A vignetting glass may be made by pasting a black patch of the form of the aperture desired upon a white sheet of paper, and then taking a negative of it by means of the camera. The focus must be adjusted so as to cause the edge of the patch to be soft and hazy.

PHOTO. ASSISTANT.—Previous to making an endeavour to "improve" the process it would be well for you to acquire a more intimate practical acquaintance with it. The objections which you urge against emulsions are only fanciful, and do not exist in fact. Had you made only a single experiment you would have found that the film given by the use of an emulsion is very far indeed from being "necessarily coarse and granular."

MARY AND SUSAN B.—The following is said to form one of the very best mixtures for mounting photographs:—Take three teaspoonsful of starch mixed to a paste with cold water, and an ounce of good glue dissolved in hot water. Boil the two together till quite thick, and pour into a pot for use. A piece can be melted with a little warm water to the proper consistency. By the addition of an antiseptic this mountant will remain good for several months.

COLONEL BRYCE.—1. The coffee process may be practised either with or without sugar.—2. A teaspoonful of coffee to half a breakfast cup of boiling water. Stir up well and allow to stand for at least a quarter of an hour, after which decant and filter.—3. The only distinction we can suggest between *eau bouillante* and *eau distilée* in the formulæ alluded to is that in the former case ordinary rain water may be used if it be "brought to the boil;" while in the latter cold distilled water must be used.—4. When very freely translated *café moka en poudre* means merely a good sample of ground coffee.

AN OLD PROFESSIONAL.—It would afford us great pleasure to give you all the details of the processes respecting which you inquire but for one consideration—we never devote the column of "Answers to Correspondents" to the mere teaching of a trade, which would most assuredly be the case in the present instance. If you can make the large sums you mention by adding to your present business that of a photolithographer you must do one of two things—first, either educate yourself in the technical details of the business by reading the various articles which have appeared in previous volumes of this Journal, and conducting experiments based upon such reading; or, secondly, apply to a qualified instructor in the art, and by payment of a suitable fee—which we understand varies from twenty to fifty guineas—obtain in this manner such an amount of knowledge as your instructor is able to impart or you to receive. In reply to the question in the postcript of your letter, we are quite conversant with the Gillot process of producing surface blocks.

GEORGE SCOTT.—The defect described is one for the remedy for which you must apply to the camera-maker. Your description has been so clearly written that we are enabled without any doubt to indicate the cause of the fogging of the plates. There is a leakage of light—or, more correctly, an admission of light—between the shutter of the dark slide of the camera and the face of the portion against which it slides. Pull the shutter half way out and examine, from behind—by opening the door of the slide—whether a small portion of light is not admitted owing to the imperfect fitting of the shutter. We have more than once found it necessary to insert a slip of velvet ribbon in the slide, in order to thoroughly prevent the admission of light. It is due to our leading camera-makers to say that *they* invariably take steps to provide against the admission of light in the manner indicated, and hence we infer that your slides have been constructed by a maker who has not had great experience, or, at any rate, an adequate knowledge of the requirements of photographers.

THE PHOTOGRAPHIC EXHIBITION.—We have received the following announcement made in connection with the forthcoming exhibition of the Photographic Society of Great Britain. The exhibition will be opened to the public on Wednesday, the 9th October, and close on Tuesday, the 12th November. Pictures must be sent in not later than the 28th September. Each frame shall have the exhibitor's name and subject, written on a *label*, fastened on the left-hand lower corner of the picture; but no address, or anything in the character of an advertisement, will be permitted.—Bronze medals will be awarded as follows:—Two medals for the pictures, or series of pictures, which, in the opinion of the judges, shall display the greatest amount of excellence. One medal for the best landscape, or series of landscapes. One medal for the best portrait, or series of portraits. One medal for the best single figure study. One medal for the best *genre* picture, or series of pictures. Two medals for the best photo-mechanical prints. One medal for the best transparencies. One medal for the best microphotograph, or series of microphotographs. One medal for apparatus.—Medals will be placed at the disposal of the judges for any novelty, or other form of excellence, in process or result.—The medals will be awarded by a jury of seven gentlemen, as follows:—Two artists (painters): E. J. Poynter, R.A., J. Brett. The President of the Society: James Glaisher, F.R.S., &c. Two members of the Council: Francis Bedford, H. P. Robinson. Two members of the Society: F. Piercy, H. White.—The exhibition will be open to all photographers; but to non-members a charge of one shilling per square foot will be made for wall space, the minimum charge being five shillings.—L. DARWIN, Lieut. R.E., Hon. Sec.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

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PHOTOGRAPHIC ENGRAVING IN HALF-TONES.

Our attention has been directed by Captain J. Waterhouse, B S.C., Assistant Surveyor-General of India, who is at present on a visit to this country, to a method he has adopted of obtaining a grain in plates prepared for photographic engraving. We may premise that numerous methods for securing this end have been suggested and published, some of them, including the processes of Talbot, Placet, and Woodbury, being highly successful. In most of the methods which have been published the grain has been obtained by mechanical means.

When trying some experiments with a process invented by M. Audra, a French amateur, in which the grain upon the plate is secured by the interposition of a collodion film upon which the required grain has been impressed, Captain Waterhouse was led to try if this mechanical proceeding could not be superseded by chemical means. The result of several experiments was the discovery of a method by which a grain possessing great fineness and excellent effect was obtained.

Ordinary autotype carbon tissue having been sensitised in a five-per-cent. solution of bichromate of potash is dried and exposed to light under a reversed negative. A well-polished copper plate having been provided, its surface is silvered by being rubbed with a mixture of tripoli and the following solution:—

Nitrate of silver	1 part.
Cyanide of potassium	10 parts.
Water	100 ,,

To a plate prepared in this manner the exposed carbon tissue is transferred in cold water, and by means of the squeegee is pressed in intimate contact with it. The object of the silvering is to prevent subsequent adherence to the newly-deposited copper in the electrotyping bath in a succeeding operation.

The gelatine tissue attached to the copper plate is allowed to dry, and is then developed in warm water in the usual manner, great care being taken not to allow any of the lines to become loosened—an accident which is very liable to happen, though the preliminary drying of the tissue before development tends to prevent it.

After all the soluble gelatine has been removed from the surface of the plate, it is immersed (after being drained) in a bath composed of—

Tannin	5 parts.
Alcohol	100 ,,

This at once removes all moisture from the gelatine relief, hardens it, and gives it a fine grain, coarser in the shadows than in the lights. The plate remains a few minutes in this bath till the action is complete in the deepest shadows; the tannin is then washed off with a little spirits of wine, and the plate is allowed to dry.

It will thus be seen that, so far, we have obtained the most perfect conditions under which granularity can exist, namely, a fine grain in the high lights, a coarser degree of granularity in the middle tints, and the shadows possessing the greatest coarseness of grain.

The next step consists in obtaining from the gelatine picture a metallic cast which will faithfully reproduce its various phases of granularity. Captain Waterhouse adopts the following method:—A band of copper having been soldered to the copper plate, its back is coated with Brunswick black, to prevent deposition of the copper upon it. When the backing is dry the margins of the picture are cleaned with a little of the silvering solution. The gelatine surface then receives a very slight coating of wax dissolved in turpentine, which is well polished off, and is then rubbed over with fine plumbago or bronze powder, to render the surface conducting. The plate is then ready to be placed in the depositing trough.

Although any good electrotyping arrangement may be used, Captain Waterhouse prefers a Smee's battery, with a separate depositing trough, containing a solution of ten parts each of sulphate of copper and sulphuric acid in a hundred parts of water. A plate of copper—to serve as an anode, and connected with the silver plate of the battery—is laid horizontally about an inch above the bottom of the depositing trough, which should be large enough to allow the plate bearing the gelatine relief to be slipped under the anode. The relief plate is connected with the zinc plates of the battery, and when everything else is ready the circuit is completed by slipping it into the depositing trough under the anode. By laying the plates horizontally the deposit is more even, and the gelatine film seems to be more readily covered with copper. When the deposit of copper is of sufficient thickness it is separated from the matrix, and after a gentle rubbing with an oiled cloth is fit for printing.

DISCOLOURATION OF TRANSFER PAPER.

When we wrote our article, in last week's number, on *An Unsuspected Cause of Fading in Carbon Prints*, we were not sufficiently sanguine to expect that out of that publication would so very soon have arisen the exceedingly important discovery to which it is now our privilege to direct attention. Prompt to enter with avidity into all that concerns the progress of carbon printing, the Autotype Company have, it appears, been of late intensely alive to the subject of the discolouration of the whites of carbon prints, by which is really meant the permanence of the paper upon which these prints are presented to the public. Of course we knew that the Autotype Company, having access to the best chemical skill available in this country, were exceedingly likely to have this matter brought under their most careful consideration; for, in their recognised position as occupants of the chief place in the carbon world, it was most unlikely that they would allow anything affecting the character of carbon printing to escape their notice.

The discovery of Mr. J. G. Tunny, that transfer paper was affected by light, has been followed by the still more imposing and, we might almost add, appalling discovery by the Autotype Company that it is not the transfer paper, *as such*, that fades, but the plain paper as supplied by the paper manufacturer which is liable to such a disagreeable change. The evil has at length been "run to earth;" and notwithstanding the small individual losses that may have accrued pending this great discovery, these sink into insignificance in the presence of the immense gain secured by the discovery. We earnestly direct attention to the article by the Autotype Company in the present number; and we believe that they have, by their experiments on the discolouration of plain paper by light, also imparted most important information upon certainly obscure, if not altogether unknown, causes of the fading of silver prints upon albumenised paper. Several specimens of the fading of plain paper upon exposure to light under suitable masks disclose the fact—interesting to all, but doubly so to photographers—that numerous samples of exceedingly fine paper, as supplied from the mill in rolls, are liable to become rapidly discoloured when exposed to light.

We hail this discovery with great pleasure, because we shall now have a fair guarantee that in future no samples of paper will be imported into carbon printing that are liable to discolouration; and we call upon albumenisers to exercise a similar amount of watchful care over the paper made use of by them. They, as well as others, are much indebted to the researches of the Autotype Company recorded in another page—researches which, it appears, have been conducted for some months past.

Upon a careful examination of a large number of specimens of paper—prepared and unprepared—we have received from Mr. J. R. Sawyer, the director of the Autotype Works at Ealing Dene, we are compelled to admit that the preparations to which they are subjected, and in virtue of which they are converted into "transfer" papers, not only do not conduce to their becoming coloured under the prolonged action of light, but actually retards such discolouration.

ON DIFFERENT MODES OF DEVELOPMENT.

In the course of our recent experiments in connection with indoor portraiture we have availed ourselves of numerous opportunities of testing the respective merits of the various methods of development applicable to the particular description of plates we have employed, and the experience gained may probably be of use to some of our readers who may take up the same line of practice.

Wet emulsion plates, which we have principally employed in our experiments, offer a pretty wide choice in the matter of development; for with very slight variations in the treatment of the plate previous to exposure any of the modes of development in ordinary use may be applied. It will be our aim to describe the peculiar features of each combination of circumstances in order to assist beginners in this branch of photography in selecting the particular system which may seem the most suitable. We may premise that the action of the different developers when applied to portraiture differs in some instances very materially from the result obtained under similar conditions when a landscape is in question; but the apparent difference, when it exists, is clearly explainable when we consider the altered requirements in the two cases.

It is scarcely needful to refer to the different circumstances of light which prevail in either case, though this to a certain extent exercises an important effect upon the result. The real or principal cause of difference consists in the character of the picture required. A landscape may be photographed under almost any conditions of light without any incongruous result, but in portraiture this is not so. If from defects in the system of lighting, or from any other cause, the shadows are brought into a little greater prominence than ought to be the case from a pictorial point of view the result is neither a picture nor a portrait. The so-called "Rembrandt" pictures, which revel in contrasts of light and shade, are not unfrequently, in the hands of a clever manipulator, made to combine a likeness with picturesque effect; but the ordinary operator will find it better and more to his interest to abstain from any attempt to introduce strong contrasts into his pictures—at least until he is thoroughly master of his light—and then to bear in mind that what may seem to him a "picture" is not necessarily a "portrait" when viewed by the critical eyes of intimate friends of the sitter.

We have said that defective lighting is the cause of this inharmonious result; but defective or improper development combined or not with errors in exposure is quite as fruitful a cause of failure. With the most perfect system of illumination emulsion plates frequently fail in giving an equal result to a wet plate, simply from want of proper development. Our first experiments in portraiture upon this class of plates were made in the studio of a professional photographer, and side by side with wet plates for comparison. The conclusion arrived at was that, though the emulsion plates were quite equal to the others in rapidity, the quality of the picture was inferior, being "patchy" and wanting in harmony. A very considerable prolongation of the exposure failed to improve matters, and we have now reason to believe that the inferior result was entirely due to the employment of the same mode of development adopted for landscape work.

To illustrate the different effects obtained we may commence with the most generally employed—alkaline development. This term covers a very wide range of modifications; but, for practical purposes, we may divide it into "weak" and "strong." Now, in landscape work a developer strong in alkali is known to give with a short exposure an image vigorous and full of detail, and requiring very little after-intensification. With weaker alkali we obtain a less vigorous image at the outset—a prolonged application is necessary for the production of the same amount of detail, and greater trouble is required to produce printing density; but the picture when completed presents a softer, perhaps "flatter," appearance. The difference amounts merely to this—that the subject is rendered in each case in a slightly different style, each in its way excellent and presenting no defect either manipulatory or pictorial.

We have before us as we write two portraits taken in a bi-lens camera with simultaneous exposure. After exposure the plate was cut and each half developed separately—the one with strong, and the other with weak, alkali—and the best result in either case obtained. With the strong ammonia we have a picture with powerful contrasts, the line of the cheek and the shadows under the eyebrows being strongly marked and forming a somewhat patched appearance. The other half, which took a much longer time to develope, presents a more even, almost "flat," picture, the most prominent markings of the face consisting of but faint suggestions of shadow. Though neither of them perfect, the last named forms by far the most pleasing picture *as a portrait.* Had the subject been a landscape the choice, if any, would probably have fallen the other way.

After varying the experiment in a number of ways we have arrived at the conclusion that the best result is to be obtained with weak alkali. Let the development be commenced with pyro. and the smallest quantity of ammonia, without bromide, and bring the detail well out before attempting to intensify. If strong alkali be used at the outset the contrast produced by its first application cannot afterwards be subdued. We have used Mr. H. J. Newton's sal soda developer, and though it works well and rapidly on an evenly-lighted picture it makes a complete "muddle" of anything in the shape of a "Rembrandt." One recommendation in its favour is the rapidity with which the development is completed; but unless this can be combined with quality of result we fear that for portraiture it will not find favour.

Ferrous oxalate works in a directly opposite manner—the stronger solution giving a harmonious, the weaker a vigorous, result. The intensification, however, must be performed with alkaline pyro., as silver, even after a concentrated ferrous oxalate solution, runs very much in the direction of "hardness." Unlike landscape work, portraiture seems to be better adapted to intensification with ammonia than to silver reinforcement; and we therefore prefer the former mode, no matter whether the first development be performed with alkali or ferrous oxalate.

The preceding remarks apply to plates used dry, simply washed, or treated with an alkaline organifier. Silver development under the same circumstances not only requires a longer exposure but produces an inferior result. There are many who still prefer silver development, though ferrous oxalate leaves little to be desired in the way of simpltcity; and to such we recommend the following modification in the preparation of the plates. The same emulsion is used, but, after coating and rinsing in a dish or under the tap until the greasy lines disappear, it is flooded with a thirty-grain (or stronger) solution of silver and transferred to the slide. In this state and with ordinary iron development it requires little, if any, longer exposure than if developed with ammonia, and behaves much in the same manner as an ordinary wet plate.

With a plain bromide emulsion and silver development a difficulty may sometimes be experienced in acquiring density; but this is entirely obviated by the introduction of a small proportion of iodide. Bromide *per se* appears to be almost as ill adapted to silver development as iodide is to alkaline; but a very slight trace of the latter makes all the difference without in the slightest degree deteriorating the sensitiveness. The best form of iron developer we are unable to indicate, having used several without discovering any marked difference; perhaps *the* best will be found in individual cases to be the one most generally employed.

We desire to impress upon all intending experimentalists in portraiture with wet emulsion the importance of noticing the difference between the requirements of that branch and landscape work, as by commencing with the eyes thus opened they may be saved a considerable amount of trouble and failure.

A NEW HEAD-REST.

It is a remarkable fact that, from the sitter's point of view, head-rests are an unmitigated nuisance. The charge against them is that they make one feel cramped and uncomfortable. It is even insinuated that a sitter's back hair will sometimes become uncomfortably "annexed" by the instrument, and it has been known to even snatch "borrowed" locks from off the head of a fair sitter—a state of matters that must be felt to amply justify the indulgence of splenetic observations on the part of the victim. "I am sure," said a lady who was forcibly expressing her opinions on head-rests, "that I can sit a thousand times steadier without the aid of one of these rests than when its horrid prongs are clamping me round the back of the head;" and, to prove the accuracy of her statement, she sat still and allowed her head to perform a series of oscillatory movements with every inhalation of her breath. The truth is that, mince the matter as we may, not more than one sitter in fifty can sit motionless without the aid of a head-rest; and, this being the case, it is absolutely indispensable to the success of the photographic artist that he make use of this instrument.

There is, however, some foundation for the well-worn assertion respecting the discomfort attending the use of the head-rest. To possess firmness a head-rest must be heavy and repose solidly upon the floor; but this quality, so conducive to its excellence, militates against its being adjusted readily and with facility. It was, we presume, when searching for some means to combine the somewhat opposite qualities of solidity and portability that Mr. Emmerson, of Leeds, who is a practical engineer conversant with the requirements of photographers, devised a method for which he has obtained a patent, and by means of which he has been enabled to combine in his head-rest several important mechanical powers, all tending to render it more efficient than hitherto.

We have been especially struck with the ingenuity by which the rest—which is both body- and head-rest—is allowed to run lightly over the floor by means of castors. Suppose the rest to be standing solidly upon the floor of the studio, and it is thought desirable to remove it a short distance, backwards or forwards, or from one side to another: we all know that with an ordinary rest this becomes a somewhat serious matter, involving, at the least, a heavy lift. But in the "standard carriage rest" of Mr. Emmerson all that is necessary to ensure its freedom of motion is that the photographer should press his foot firmly upon a small iron treadle which projects behind and is connected with a lever, when immediately three small castors, concealed in the base of the stand, are brought into play and sustain the whole weight of the rest, which can now be moved with the greatest facility. When it is required to restore the rest to its state of immobility a handle, or trigger, projecting behind forms the means of doing so; for no sooner is this pulled in an upward direction than a powerful spiral spring is brought into play, by which the castors are all withdrawn from action and the stand made to repose upon its own base. Further mechanical details will be given in a subsequent article when the specification of the patent has been published.

In addition to the feature we have described, the vertical rod upon which the rests proper are supported is affixed to the stand by means of a ball-and-socket system of peculiar construction, by which it receives a great universality of motion in every direction. A pleasing novelty has been introduced with respect to the use of horn, both as tips to the head-fork and as the material of which the large screw-handles are made. These, with the other points described, will indicate Mr. Emmerson's new head-rest to be an instrument possessing a good claim upon the attention of photographers.

WATER-HEATING APPARATUS.

We believe there is one particular cause that frequently operates in deterring photographers from taking up carbon printing, but which need by no means be looked upon as the bugbear it appears to be. We allude to the necessity for a plentiful supply of hot water. Where only an occasional "kettleful" is required the photographer who works at his art in connection with his private residence may not experience much difficulty, beyond an occasional anathema from the domestic powers that rule in the quarters he would needs have to apply to for his supply. But the photographer who can only rely upon his own professional premises, and who, as a rule, makes use of every available corner in the place, what can he do, or where, if he start enlarging, chromotype, or, in fact, autotype work generally on a large scale? The fire in his printing or varnishing room is allowed to die down as soon as possible in summer time, and in winter, though it may possibly be kept at a good heat all day, he would require to have kettles going all day long to supply anything like the demand for a reasonable amount of business. Hence he puts it off, and "will think about it," or perhaps he applies to a builder and gets an estimate for fitting up a hot-water boiler, with cistern, &c., which is likely enough to startle him by its amount into giving up the idea till that indefinite future occasion "some other time."

We would, however, at the outset remind him that there is not that need for the immense supply of water so often assumed. For such delicate work as carbon printing for *cartes*, cabinets, and such small work, generally, it is desirable to have a continuous supply—but not necessarily a large one—of clean, filtered hot water; but for an occasional enlargement, including the making of transparencies, a good-sized vessel—one holding (say) a gallon of boiling water, such as could stand by any ordinary fireplace—will be quite as much as is necessary. The very ingenious gas arrangement, for giving a continuous supply of water at any heat, which we described a year or two ago in these columns is, we believe, made use of by many, who are entirely satisfied with it, and it is quite sufficient to produce water enough for a good-sized batch of prints. Its drawback is necessarily the fact that, though a continuous supply may be obtained, it comes slowly, and if a large quantity be wanted at once for any purpose it can only be had by waiting till the required amount has dribbled out. It is not difficult to imagine cases when this would be an intolerable nuisance.

We therefore, today, will describe an apparatus in use at Mr. G. Watmough Webster's studio, which is perhaps the most economical hot-water boiler reservoir ever produced, and as efficient as economical, we believe. The hot- and cold-water reservoirs are formed by two second-hand casks holding about twenty gallons, each of which is placed on a strong wood support in a room contiguous to that containing the fireplace. The boiler, in place of the bulky constructions usually employed for such purposes, is simply a half cylinder of copper that had been used for some other purpose and discarded. Its dimensions are only ten inches long by five inches wide, and about the same height. It is not built into the wall, but merely rests on a couple of iron bars placed across the fireplace, and is kept rigid by the lead egress and ingress pipes. Naturally it blocks up a considerable portion of the fireplace, but still leaves room for an occasional vessel that may be required for any other purpose. The pipe is taken from the cold-water cask or reservoir, and leads to the bottom of the copper boiler, and from the top of the latter a pipe communicates with the hot-water cistern. Then, again, a lead pipe connects the two casks through the bottom, to prevent the water all being run off, and so leaving the boiler dry. Connected with these pipes are sundry taps, hot and cold, which need not be detailed, any plumber being able to fit and lead them in any required direction. It is hardly necessary to say that the supply finds its way through a ball cock into the cold-water cistern, and if our description be apprehended it will be seen that, when the fire is lighted under the copper the hot-water cistern is heated from it direct without circulating at all through the cold reservoir, any water drawn off being made up by fresh cold water passing through the boiler till the level of the two is alike. We believe that in the course of an hour or an hour and a-half after lighting the fire there is, as long as it is kept alight, a plentiful supply of hot water all the day through.

It is by no means an infrequent occurrence that after fixing, drying, and perhaps varnishing, a negative it is found to be too dense, and in order to obtain a satisfactory print it is desirable to reduce it. Such a case arose in our own practice a short time back, the negative being one which for various reasons we did not wish to spoil, though in its then condition it gave anything but a satisfactory print. We had the option of several published plans, all of which are more or less incorrect in principle, though they may answer moderately well in some cases, as, for instance, with a negative which is uniformly too dense in every part. For our purpose they seemed entirely unsuited, the negative being slightly under-exposed and over-intensified, presenting very dense lights with soft, delicate half-tones, and shadows verging on transparent glass. Now, with the ordinary modes of procedure, whatever action occurs takes place uniformly over the whole surface, and therefore the half-tones suffer more in comparison to the high lights. Moreover, if any of the methods based upon the partial iodising or chlorising of the image and subsequent treatment with hypo. or cyanide be used, the delicate shadows are the first to suffer reduction, and this was exactly what we wished to avoid. We put the question in this light: the image as it exists in the film commences at the surface and extends downwards to the glass (we are speaking of an alkali-developed image), the most delicate details being almost *on* the surface, the highest lights perhaps extending right through the film. By attacking the surface we remove the finer details before the denser parts are materially affected; *ergo*, to produce an opposite result we must commence on the under-side of the collodion. At first sight we could find no practical solution of the problem thus set; but after a little thought we hit upon a plan which was immediately put into practice (upon a worthless negative), and after a few experimental trials we ventured to operate upon *the* negative, the result being in every way satisfactory, though fear of spoiling the picture prevented us getting the best possible result. The method adopted was as follows:—The image was first "bleached" *throughout its whole thickness* with chloride of copper, and after well washing it was treated with an extremely weak alkaline developer in order to again reduce it. This reduction is not development proper; it is merely a chemical reaction which goes on without the aid of light, commencing at the surface and proceeding gradually downwards. If, then, we allow it to penetrate *nearly* through the film, we have a certain portion of the chloride forming the denser parts of the image still unreduced, and by removing this with hypo. we arrive at the desired object, for we, in fact, attack the under-side of the film. The chief element necessary to ensure success is to use the reducing solution sufficiently weak to enable the operation to be watched carefully. Guided by the colour of the image by transmitted light, and its appearance when viewed from the reverse side, it is easy after a little experience to judge when to stop it. It is better to over- than under-do the reduction with alkali, as the whole operation may be repeated if the first effect be not sufficient; if the hypo. be applied too soon the injury is irreparable.

INCREASING THE SENSITIVENESS OF DRY PLATES.

I believe that the following experience has not been published before in your columns, and may, therefore, be of interest to your readers.

I have an emulsion which is rather contractile, and given to splitting during drying if the film should have become loose during development and washing. This emulsion gives plates of much greater sensitiveness if, instead of allowing the latter to dry in the usual way, they be placed in distilled water till "greasiness" has disappeared, and then dried.

Still greater sensitiveness and density is obtained by coating the washed and dried film with a one-grain solution of pyrogallic acid, and again drying. This latter is an idea obtained from Mr. England's late communication to the Photographic Society. The effect of the coating of pyrogallol solution is also most marked when it is flowed over a dried but unwashed plate, greater density resulting than with washing alone.

A soaking in pyrogallol solution immediately after washing does not seem to be so beneficial as the coating when dry.

These results are, in my hands, easily observed with the ferrous oxalate developer; and sometimes I have found what would make all the difference between complete failure and success by merely coating the dried and unwashed plate with the pyrogallol solution. With the hydrosulphite of soda developer these results appear, perhaps, less marked, though I cannot say with certainty.

Perhaps some reader may attempt to repeat these experiments. It should, however, be borne in mind that a more perfect emulsion than the one experimented on may not be affected in the same manner. A probable explanation of the action of a short soaking in water is that the pores of the collodion are thereby left open to the developer. Then we must seek some other reason for the increase of sensitiveness caused by the application of the pyro. to the dried and unwashed film. But it is found that when a film is both washed, dried, and coated with pyro., the sum total of its sensitiveness is not double, or, indeed, much more than when either of the two operations are conducted singly. It appears reasonable to expect a large accession of sensitiveness from both of the modifications—one of which might be looked upon as mechanical in its operation and the other as chemical. I do not, however, find such to be the case. For the above emulsion I find French chalk very effective in keeping the film on the plate; and, even should a corner loosen during washing, a splitting does not commence at that part, as is usually the case with this particular emulsion. I find that the gelatine solution with chrome alum, unless very carefully filtered indeed, gives white, insensitive spots.

It is best to immerse the dried plate in the pyro. solution, as otherwise markings may result.

It would be interesting to know whether the pyrogallol would prevent those spots to which plates prepared from washed emulsions are so addicted after having been kept for a few weeks.

So far as I can see, the hydrosulphite of soda as a developer is preferable to ferrous oxalate, the quality of the image being superior in colour and gradation.

Perhaps a word of advice to any who may wish to try this developer will be permitted. While I do not go so far as to say that failure *must* result from the use of most samples of bisulphite of soda in the market, I may say that they are not all equally suitable. The quality I use contains water of crystallisation, whereas that generally sold does not, and, as far as I can ascertain, is sold in London only by Morson and Son, Southampton-row. The bisulphite should be obtained, as far as possible, in shining crystals, which state, in the case of the hydrated salt, ensures the absence of sodic sulphate, to which it is oxidised by the air—at least it is very unlikely to be then present in large quantity. In the case of the anhydrous salt the test of appearance is not admissible, as this is opaque and powdery. The solution must contain no free sulphurous acid; if it do it should be neutralised with sodic carbonate. The salt should be kept in closely-stoppered bottles. I give these details as I do not think this developer has received the share of attention which it deserves.

Since writing the above I have continued similar experiments with a new emulsion, and I find the same result. It is more marked than I had thought with the hydrosulphite developer. One thing I notice is curious: if a coated plate be only half moistened with water, and then dried, exposed, and developed, it will be seen that the bromide at the line of junction of the two portions is more transparent than the rest, and is also less sensitive. The transparency is also seen before development. Perhaps some organic matter collects at this point.

We hear of some difference of opinion as to the advantages of exposing emulsion plates in the moist condition. This is probably due to the different kinds of pyroxyline. If this be powdery there will be no advantage in exposing the plates in the moist condition.

It seems to me very probable that, wetting a washed emulsion film made with a tough pyroxyline with distilled water previously to drying would, at least to a very considerable extent, approach in effect to the exposing of the plate in the moist state. I shall make a trial in this direction. Herbert B. Berkeley.

"AN UNSUSPECTED CAUSE OF FADING OF CARBON PRINTS."

A leading article in your last week's Journal calls attention, under the above heading, to a new and until lately unsuspected cause of deterioration in carbon prints; and the specimens brought to our notice by Mr. J. G. Tunny place the matter in such a positive and unmistakable form as to admit of no doubt whatever, and rendered it absolutely necessary for us to probe the matter to the bottom.

The new cause of evil shows itself in the discolouration of the transfer-paper under the influence and prolonged action of sunlight. It has lately been our opinion that what has been termed "fading in carbon prints" is not a fading at all, but a discolouration, and the cause not any instability of the colour employed in the tissue or the preparation used for the transfer-paper, but the actual discolouration of the paper itself.

Some time ago Mr. Tunny sent us some prints which he said had faded. These were prints made in autotype tissue, the colouring matter being alizarine in combination with blue and black, both of known permanency. The prints were evidently discoloured in the portions to which the light had had access; those portions which had been covered by the mask retained their pristine brilliancy. We expressed our opinion to Mr. Tunny that no change had taken place in the colour employed, but that, somehow or other, the transfer paper had become discoloured, and this matter we immediately proceeded to test.

On the 13th of June we exposed in a south window in the tower of our works strips of plain paper, and also strips of the transfer-papers made upon the paper corresponding to the strips of plain paper. These were allowed to remain untouched till the 28th of July, when they were taken down and examined.

On that day we received a letter from Mr. Tunny, stating that he also had exposed pieces of transfer-paper, had found them discoloured by the action of light, and expressed his opinion that the chrome alum employed was not to be depended upon, and that it underwent a change by being exposed to light. The specimens that he enclosed showed that a change had taken place, and there appeared an *a priori* reason for supposing that the change was due to something in the preparation of the transfer-paper. Fortunately we had taken the precaution to expose at the same time as the transfer-paper strips of the paper *before* any preparation had been placed upon it, and we now lay before your readers the exact state of the case.

For transfer-paper we use two kinds of paper—one a fine Scotch paper, the other obtained from Germany of a very fine kind made expressly for us, and costing us 50 per cent. more than the best home-made paper in roll. These we marked A B C as being papers made at different dates. We found that the one marked A so slightly changed as to be almost imperceptible, that marked C had slightly discoloured, whilst that marked B had gone from a brilliant white to a cheesy colour. Now these samples of papers were exactly as they came from the rolls, without any preparation, chrome alum, or manipulation of any sort by ourselves.

The corresponding transfer-papers had also changed their colour, but not to so great an extent as the plain papers, clearly proving that, whatever may be the cause of the deterioration, nothing in the preparation of the transfer-papers has anything to do with it.

The Scotch paper bore the test a great deal better, the discolouration being extremely slight, and the transfer-paper made from it as nearly as possible unchanged.

On inquiry amongst our paper-makers, we find that it is a well-known fact that certain papers do change with the action of light, more especially that in which Esparto grass is employed in any quantity. In order to get this up to a saleable colour it has to be bleached chemically to a very great degree, and is probably tinted with aniline colour, which is of a known fugitive nature, the result being that the aniline colour flies, the bleach disappears, and the paper returns to its original hue.

Our own carefully-conducted experiments prove that the chrome alum is practically inert, and may be used with perfect safety; but it is necessary to guard against the proceedings of the paper-makers themselves. No doubt, in a variety of circumstances, the discolouration does not signify. Everybody knows how old books, old engravings, framed diplomas, and show-cards in shop windows are constantly seen in a discoloured state. We have before us a lithograph of the city of Paris the centre of which has become discoloured, leaving about three inches all round, where the stretcher covers the original tint.

But all this does not touch pigment printing, excepting that it shows the absolute necessity for testing the paper before it is used. A six weeks' exposure to a summer sky, in a south window, is a sufficient trial for any paper; if it remain practically unchanged after passing that ordeal no fear need be entertained of the permanency of the carbon print placed upon it.

It would be interesting to know how much of the discolouration—the abnormal discolouration—of silver prints of late years is due to the paper. Does not this go some way to account for the extraordinary discrepancies in the behaviour of silver prints? The most careful treatment, perfect washing, the best manipulation in every stage, may be completely neutralised by some treatment the paper may have received before it ever comes into the hands of the persons who prepare it for photographic purposes.

Amongst all our own papers we find only one batch really bad, and another is slightly imperfect; but it was scarcely possible to foresee the weak point in this matter. The imperfect papers were bought as papers of the best quality from a maker of reputation. Economy has always been out of the question with respect to the Autotype Company; they have always bought to the best of their judgment the highest class of material that money could command. It is unfortunate that the weak point was not discovered before, but now that it is found it is easy to guard against it. It must also be remembered that the paper, even at its very worst, though it may discolour under a six weeks' exposure to a summer sun, changes but little exposed in a room or under ordinary circumstances; but it is of the greatest importance to insist that our paper-makers shall supply, for all photographic purposes, absolutely pure and unadulterated material. We beg to enclose the samples referred to.

The Autotype Company.

ON THE ACCELERATION OF OXIDATION BY THE LEAST REFRANGIBLE END OF THE SPECTRUM.

[A communication to the Royal Society.]

In my first note on this subject it was stated that further experiments would be undertaken, in which sensitive films would be exposed to the action of the spectrum in atmospheres free from oxygen. These have been carried out by means of apparatus specially designed for the purpose, hydrogen and nitrogen being the atmospheres employed, and in some cases hydrogen vacua. In every case the experiments were confirmatory of what was previously surmised, the image showing no signs of oxidation; and there is evidence to show that the limit of sensibility of the compounds used is lowered towards the least refrangible end of the spectrum.

Exposure of films in solutions which readily combine with oxygen, and at the same time with the halogens, have given most remarkable results. For instance: silver bromide, which by its colour should have proved sensitive to the red end, yet when exposed in the usual manner was insensitive below B in the spectrum, proved sensitive when exposed in sodium sulphite (Na_2SO_3), and arrived at the lowest limit (about W.L. 12,000) which I have as yet photographed. In the same solution, to quote another experiment, silver iodide proved sensitive to a point between a and A. The experiments were carried out in duplicate. In one the plate was immersed in the solution, and in another the salt was dissolved when possible in glycerine and applied to the film. Both methods answered equally well, but for some purposes the latter is more convenient.

My experiments also prove that what is technically known as solarisation is due to the oxidation of the image, accelerated by light generally, be it the more or less refrangible end of the spectrum. This oxidation causes the formation of a compound which is undevelopable, as has already been pointed out. It has thus been found impossible to produce solarisation in solutions which have oxygen absorbents. We may therefore conclude that the whole spectrum exercises a reducing action on the sensitive salt, and that this reduced compound is again capable of being oxidised by it.

The relative power of the two actions seems to vary according to the part of the spectrum. This subject is still under consideration.

In my first note I also mentioned that photography in natural colours probably depended on the same action. My surmise is confirmed to a great extent. If silver sub-chloride or silver sub-bromide be produced chemically we have a dark compound formed which, if exposed to the action of the spectrum whilst in an oxidising solution (such as hydrogen peroxide), rapidly takes the colour of the rays acting upon it, the yellow being the least marked. The red, green, and blue are, however, particularly well rendered by reflected light, and the plate shows the colours as seen when a dull light is thrown on the slit of the spectroscope—a simile which was suggested to me by Mr. Norman Lockyer.

From the evidence obtained by these experiments it appears that two or three molecular groupings are sufficient to give the necessary colours—a subject which I only allude to since the more general question of molecular groupings is being considered by others.

W. de W. Abney, R.E., F.R.S.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

To expose a plate in the camera by means of electricity is doubtless a very pretty idea, and also one that can very easily be carried into practical effect, especially as regards the requirements of the professional photographer who keeps his battery in a garden or cellar and "leads on" the electric current into the operating-room by means of a small wire. But what about those who have neither garden nor cellar, nor even a spare cupboard in which to place the battery so necessary to the electrically-moved lens cap? What about those peripatetic photographers, like myself, who are continually finding themselves here, there, and everywhere? The reply is—You are to conceal a tiny, yet powerful, battery inside the camera itself. True; quite possible and practicable and very easy to boot. But—is it not known that there is a liberation of ozone by the action of a galvanic battery? And has it not been shown at a recent meeting of the Photographic Society of Great Britain that ozone acts in a most deleterious manner upon an impressed photographic plate? If such be the case I think it will be found in practice to be inexpedient to place a battery, however small, inside the camera in which the plate is to be exposed. Old daguerreotypists well know the astounding and sometimes disastrous effects that were produced by allowing even the faintest trace of the vapours of iodine, chlorine, or bromine to fall upon the surface of an exposed but undeveloped daguerreotype plate. Expose as long as you like, and a clever trickster who may have had access to your camera could effectually prevent you from ever being able to develope an image upon a daguerreotype plate.

Window portraiture is a subject of attractiveness to every amateur and not a few professional photographers. When I read the article on that subject in a recent number of The British Journal of Photography I thought of a little bit of experience I recently had in that direction. My sitter is one whose name is illustrious in history. He has long been unable to leave his room in consequence of an illness which, in all probability, will eventually terminate fatally. He can be wheeled from his bedroom to a parlour, the bay window of which "looks" into a garden whose dimensions are so small that there is a distance of only twenty feet between the window and the thickset, laurel hedge which isolates it from the public gaze. The window, I may state, is open to the south. Now, to obtain a proper portrait by placing the camera *inside* the room was found to be impossible, no matter how skilfully the subject was hedged round with reflectors and screens. But, bearing in mind something that years ago I had read in one of The British Journal Photographic Almanacs, I had my sitter wheeled up close to the window, which was then thrown wide open, the camera being placed in the garden. Owing to the southern exposure I had to wait until the sun was overcast with clouds before I could take the picture; but the three negatives that I obtained as the result of this composite order—indoor and outdoor—of "window portraiture" attest the great value of this method of proceeding, when under other conditions failure would inevitably be the result. If I thought that I should not incur the charge of occupying too much valuable space I could easily and willingly have devoted a whole article to this subject.†

Bravo! A duel! By all means let us have it! Comparisons may be "odorous," as the elegant Mrs. Malaprop hath it; but if one man in Paris and another man in London possess processes which "lick creation" as respects rapidity, the only way to have the question of individual superiority determined is to have them to meet together on neutral ground, and in the presence of a jury to fight it out in the only way in which such a matter can be determined, namely, by practical demonstration. This is *apropos* of a recent brief article by Mr. A. L. Henderson, in which he gives a hint respecting a practical trial, on Paris ground, of his method of working compared with that of M. Boissonnas, whose charming pictures when exhibited here last year elicited unqualified expressions of approval. Now, if M. Klary, who is about to visit this country, can be prevailed upon to meet Mr. Henderson in a friendly tournament it would be exceedingly interesting; and to place it on a very low ground it would pay well, for numerous professional photographers would most willingly pay a liberal fee to be present during the trial of skill. Rapidity in the wet collodion process is a point of vital importance to a portrait photographer. In the meantime I, and many others, look forward with impatience to the time when Mr. Henderson is to redeem his promise of supplying particulars of the method he employed when he competed successfully with M. Klary in Paris.

Those photographers who are intending to contribute to the next exhibition of the Photographic Society of Great Britain must "look alive." August is one of the finest months in the year for obtaining landscapes replete with beauty.

The members of the South London Photographic Society met a few days ago at the house of their highly-popular and much-respected President to enjoy his annually-proffered hospitality. Is this fair? and should not meetings of this kind be "stamped out?" I know several who are presidents of societies, but who are not perhaps so fortunately situated as respects worldly surroundings as Mr. Statham. Moreover, what is a mere "flea-bite" when a society numbers a dozen members becomes a serious tax when it expands as the South London Photographic Society has done. It is my opinion that private hospitality under such circumstances is an entire mistake, and that "the saddle ought to be put upon the right horse." If a gentleman—and I don't now refer to any society in particular—is good-natured enough to take the often onerous office of president, the members of that society should, as a *quid pro quo*, enact the *rôle* of host to such president or other officers to whom they stand indebted. I feel this is a delicate matter, but it is one that must be referred to sooner or later. You must know that I myself have some intention of becoming a member of the South London Photographic Society, but am deterred by the thought that I may be elected president (you see that I am modest), and, if so, that I may not be able to follow suit in the sumptuous entertainments so liberally and generously provided in past years. *Verb sap.*

* Concluded from page 365.

† Our peripatetic correspondent is irritating. He knows, or ought to know, that the treatment of this subject in even the *fullest* detail would be most welcome to ourselves and readers.—Eds.

THE APPLICATION OF PHOTOGRAPHY TO THE PRODUCTION OF PRINTING SURFACES AND PICTURES IN PIGMENT.

IN SIX LECTURES.

III.—LINE ENGRAVING ON METAL PLATES.

[A communication to the Society of Arts.]

We now go back to the first photographic process discovered—that is to say, the first process which gave photographic representations which could be exposed to light without destruction—the bitumen process of the hard-working and patient Niépce. This investigator noticed that the residue left on the drying of certain varnishes became insoluble by exposure to light. About the year 1814 he covered metal plates with a bituminous varnish, exposed them in the *camera obscura*, and after exposure he subjected them to the action of similar solvents to those originally employed in making the varnish. Under these circumstance those parts of the film which had been exposed to strong light refused to dissolve, while the unexposed parts dissolved, a negative image being thus formed on the metal plate. To convert this negative image into a positive those parts of the metal which were uncovered by bituminous matter were darkened by the vapour of iodine, and the bitumen was then removed by the use of a more powerful solvent. By the application of a suitable acid to the bitumen pictures on metal the bare parts were dissolved away and engraved plates were obtained. Here is a specimen of bitumen or mineral pitch—a substance which is found in most quarters of the world. Let us powder a little and pour benzole on it. You see that it dissolves quite easily, and the solution runs freely through this paper filter. You see that the solution is about as thick as collodion, or, perhaps, rather thinner. Now, here is a carefully-cleaned copper plate, such as the engravers use, and you see that I am going to clamp it down on to this turn-table. The next step is to flood the plate with bitumen solution, and then to make the table revolve quickly. Now it has revolved a few seconds, and I think the film will be dry. Here it is. I hand it round, so that you can judge for yourselves as to the advantages of this method of coating the plate. I know of no other method by which such an uniform and compact film of bitumen can be obtained. After coating it is well to put the plate aside for twelve hours, in order that the film may become harder. It is then necessary to dust it over with French chalk, to remove stickiness; and, after this, it is placed behind a transparency and exposed to light. The time of this exposure may vary from twenty minutes to two days.

Here is a plate which has had the requisite exposure, and the next matter is to dissolve away that portion of the bitumen which has not been made insoluble by the action of light. Now, benzole is too energetic a solvent for my purpose, and oil of turpentine is not sufficiently active; but, by mixing these together, you can get any degree of solvent power which you may require. I will get Mr. Barker to treat this plate with the solvents. You see that he commences by flooding the plate with oil of turpentine, and, as this has not sufficient action, he pours it off and adds a little benzole. This begins to produce an effect, and enables him to judge as to the amount of benzole which he may safely add to the oil of turpentine. He has added this quantity, and has now washed away all the soluble bitumen from the plate, which is next thoroughly rinsed with water to remove the oil of turpentine. You see how extremely sharp and well-defined the lines are. I next place the plate in nitric acid, so as to etch the lines where the metal is bare; and, while the etching is in progress, I will get Mr. Barker to dissolve away the soluble bitumen from this glass plate, when we shall find remaining the bituminous reproduction of a page of letterpress, which I can show you by means of the lantern. Our first plate is now sufficiently etched, and when I have cleared off all the bitumen, by rubbing with a rag and benzole, the plate will be ready for the printer. It is now clean, and I will hand it round for you to examine.

Mr. Barker has now the bitumen image on the glass plate, ready for the lantern. The image is now on the screen, and you see how sharp and well-defined the lines are. I take the plate out, and if you examine it you will notice that the letters are raised on the glass, they being, as you know, formed of insoluble bitumen. If we wish to etch the glass it is merely necessary to expose it to the action of hydrofluoric acid, as I do now.

So much for the line-engraving process of Niépce; but before you go I want to show you that very perfect half-tone transparency pictures may be produced by means of bitumen. Here are some pieces of sheet gelatine and some pieces of talc which have been varnished on one side with bituminous varnish. I hold two of these—one being on talc and the other on gelatine—over against the lime-light, and you merely see even films of bitumen, but no image. There is, however, in each case a picture of insoluble bitumen imbedded in the films, and I will get Mr. Barker to dissolve away the soluble portions, so as to lay bare this hidden image. He will use a mixture of oil of turpentine and benzole as a solvent.

Supposing that the varnished side of the talc or gelatine is placed in contact with the negative, and the light is allowed to shine through it: those parts of the bitumen film which are under the perfectly transparent parts of the negative become insoluble, let us say, all through. Now, those parts of the film which are under less transparent parts of the negative do not become insoluble all through, but a skin of insoluble bitumen is formed on the surface of the bitumen film, this skin varying in thickness according to the amount of light which has given rise to it. Put a varnished and exposed gelatine sheet of this kind into the solvents, and note the effect. When the film is made insoluble all through it resists the action and remains on the talc; but where only a skin of insoluble bitumen exists on the surface of the film the solvents loosen and dissolve the bitumen from underneath this skin, and away it floats. Now you can understand why the bitumen process, in its ordinary form, is only adapted for the reproduction of subjects in extreme black and white, such as line engravings or letterpress. Now, if we wish to preserve the half-tone picture intact we must expose through the transparent medium (talc or gelatine) so as to ensure every part of the insoluble image, whatever its thickness, being in contact with the transparent support. Those prints which Mr. Barker is developing were done in this way, the talc or gelatine being placed in contact with the negative. The small thickness of talc or gelatine does not render the image notably unsharp. It was only during the last week that I thought of making bitumen transparencies by this method of printing against the back of the film, so I have not had time to make many examples. Mr. Barker has now finished the washing away of the soluble bitumen from those which he took in hand some minutes ago, and as I exhibit them on the screen you will see how perfectly all the gradations of half-tone are represented. You quite understand that a picture of this kind is solid, the gradations of light and shade being due to a greater or less thickness of bitumen, and that the essential points in producing them are to varnish a thin, transparent medium with bitumen, to expose to light through this medium, and then to dissolve away that portion of the bitumen which has not been acted on by light. The ordinary black varnish sold for backing glass positives will answer very well, and so will some samples of Brunswick black. Here is a transparency which was made with ordinary Brunswick black; remember, however, that some samples of Brunswick black are not sensitive to light, these being probably made with coal pitch.

I think that by the method which I have just indicated very fine lantern slides may be produced, as there is an entire absence of texture or granularity, and it is possible that the bitumen pictures may be stained or toned without difficulty. As I told you before, I only recently thought of this method, and perhaps some of you will experiment with it.

On the table are some plates and specimens illustrating the process of engraving on bitumenised plates, and you will specially notice the great clearness and sharpness of the lines produced by this method. Messrs. Leitch and Co. have kindly lent me some of their photo.-engraved plates, which you will examine with much interest. These copperplates have been covered with a thin film of iron, by the electrolytic method; and as the film of iron is extremely thin it does not in any way interfere with the printing qualities of the plates. When the surface of a plate begins to wear a little, and the impressions show signs of deterioration, the plate is sent back to Messrs. Leitch and Co.'s factory, where the film of iron is dissolved off by means of dilute sulphuric acid, leaving the copperplate as good as ever. The film of iron, although so thin as not to injure the printing qualities of the plate, is nevertheless sufficiently thick to protect the copper from injury in printing. The plate having been freed from the first worn-out film of iron, is once more coated with a layer of iron, and is again ready for use. When the second film of iron is nearly worn away, and the printer approaches near to the true surface of the copper plate, the iron is again dissolved away, and a new coating of iron is put on. According to this system one really prints rather from a cast of the plate than from the original plate, and new casts are made as required.

Here are some admirable specimens of photographic engraving by Mr. Dallas—a gentleman who is always to the fore in matters connected with photo-mechanical printing.*

Before you go I wish to call your attention to a very simple and expeditious way of making engraved plates from line subjects. Here is a photolithographic transfer made from a positive instead of from a negative, as is usually the case. You see that the ground is black and the lines are white; in fact, by far the greater part of its surface is black. I now lay it on a zinc plate and pass it through the press. Now, what will be the result? I will tell you beforehand. So much of the paper being covered with printing ink, and so little being white, moist, and gelatinous, the transfer will slide over the zinc plate and we merely get a smear. Here it is. I have here another transfer similar to the last, excepting that white patches are introduced on it wherever they can be introduced without falling foul of the picture. This is done by painting on the transparency with Brunswick black. On putting this transfer down on a zinc plate you see that it adheres properly, and we have a perfect image on the metal. As the white patches are now done with I varnish them over, and you see that the zinc is covered everywhere except where the lines of the engraving are bare. The covering on the zinc is now made denser by inking and dusting with resin, as I explained in the last lecture, and the plate is then etched by dilute nitric acid. Here is a plate already inked and dusted; I place it in this dish of nitric acid and allow it to remain a few minutes. I now clean off the ink, and you see the lines are engraved on the zinc plate. The plate may now be printed from in the copperplate press, or, as zinc is not a convenient metal for deep plate-printing, it may be reproduced by the electrotype process. THOMAS BOLAS, F.C.S.

* After the lecture Mr. Dallas informed me that he has been in the habit of coating the surface of his plates with iron, as described above.—T. B.

NOTES FROM AMERICA.

THE MAGIC LANTERN IN JAPAN.—THE STEREOPTICON.—RAMBLING HINTS.—REVERSED NEGATIVES.

FROM the *Exhibitor*, a new quarterly serial devoted to the subject of the magic lantern, issued by C. T. Milligan, Philadelphia, we get a peep into the palace of the Mikado of Japan, through the descriptive powers of Professor E. W. Clark, late of the Imperial University, Tokio, Japan. This gentleman had the privilege of giving a stereopticon exhibition in the presence of the Mikado and all his household and a few of the officers of state, at his Majesty's palace at Akasaka, in Tokio. Arrangements had been made for the exhibition some time beforehand, but owing to the sickness of the Tokudaiji, or Lord Chamberlain, it was somewhat delayed; besides, no such thing as a foreigner obtaining access to the imperial household for such a purpose as this had ever been heard of before, and of course the numerous officials connected with the Kunaisho, or Emperor's household department, felt in the beginning not a little shy about it. However, it was finally decided that the Mikado, the Empress, and her ladies should have a fine series of views of foreign lands:—

On July 3rd, therefore, says Professor Clark, I proceeded to the palace, in company with Hatakeyama, to select the rooms best adapted to my purpose. Crossing over the narrow embankment of the moat at Akasaka, where Iwakura was cut down some months ago, we passed through the outer gate and by the line of guards, and then through a second guarded gate, showing our wooden passports to the sentries as we entered; and walking up a broad stone path, we were received by the Kunaisho officers, and led in through an endless labyrinth of rooms to the inner reception parlours of the Emperor. These parlours are large and elegantly carpeted, and though the ceilings were not so high as I wished, yet I selected the best apartment as the place suited for the exhibition. On Tuesday evening I had my instruments all set up in the palace in readiness, and the large curtain was suspended from the top of one of the partitions of the apartment. I had two large screens arranged around the instruments, which the officers had first fixed so as to shut off the seats intended for the Emperor and his household from all the rest of us in the room. But, as soon as they had retired to give notice that all was ready, I made a slight but quick change, and pulled the screens backward, so as to make the way clear for a clearer and larger picture on the curtain, and I caused the Mikado's elegant chair to be placed in the little alcove, formed at the end of the zig-zag screen, and just to the left of my stereopticon, where he would have the finest possible view in the room. In front of his chair was a small table, covered with a rich gold-embroidered silk cloth; on his left was another little table, and a seat for the Empress, while in the rear were several lines of upholstered chairs, of very handsome style, for the maids of honour and other members of the household. A few days previous to the exhibition I had requested Mr. Katz and other officers of the Naval Department to lend us one of the marine bands to give music to the occasion. Consequently, on riding up to the gate of the palace in the evening, I met two bands instead of one, just marching up the hill; they formed in line in two companies, inside the gate, numbering sixty men in all, and began tuning their trumpets for the "show." After waiting for some time for the foreign leader of the band to make his appearance I got the musicians all together in a side room near the large parlours, and, giving them directions to play the hymns appropriate to the foreign countries, which would be shown in regular order, I left them to do the best they could, even though their proper band-master was not with them. At first they did splendidly, though the volume of sound of so many instruments was considerable; but later in the evening they lost discipline a little, and numbers of them came up slightly behind the stereopticon to see the pictures, though they made believe they had come merely to hear what particular piece they should play next! However, it was only a little amusing on the whole. As soon as everything was ready for the exhibition, notice was sent to the Mikado's apartments that all things were awaiting His Majesty's pleasure. The Emperor and Empress were ushered into the room, followed by quite an impressive retinue, consisting chiefly of young ladies dressed in white, with their long dark hair streaming behind, and broad red sashes encircling their waists; the effect was really very pretty, and quite unique, as this charming procession of fair ones entered, and quietly seated themselves behind His Majesty, while the band struck up the "Mikado's Hymn," and the word "Welcome," with the wreath of flowers, was thrown by the brilliant light upon the curtain. The chief officers of the Kunaisho, or the Household Department, sat on the opposite side of the room from His Majesty, and a little to the right a few attendants were also placed. Arisegawa, Fushinomiga, and Tokudaigi, the Lord Chamberlain, and several other high officers were in attendance on His Majesty; and everything passed off in a very pleasant and social manner, there being nothing stiff or formal, and yet there was a subdued stillness and becoming dignity about it. At the outset dissolving views were exhibited, showing Windsor Castle, Sandringham Hall, the Parliament Houses, and other English and Scottish places of interest, during which the band played "God Save the Queen." Then followed many American views of interest, such as Niagara, the Yosemite, and the principal scenes in Washington, New York, Boston, &c. After these, magnificent views of Paris, Berlin, Switzerland, and Northern Italy were presented in brilliant succession. Mr. Hatakeyama (who accompanied the Embassy in all their European experiences, and at their various court receptions, &c., abroad), sat near His Majesty, and explained all the views as they were announced, designating, at the same time, the particular places visited by the Embassy, and enlivening the occasion by little incidents of their experience. At Hatakeyama's request I announced briefly the names of all the places as they appeared, and he immediately translated it to the Emperor, adding such remarks as he wished. The Mikado seemed exceedingly interested, and although nearly everybody else was quiet in his presence, yet he conversed freely and naturally, asking many questions upon places of particular noteworthiness. After nearly a hundred of the various well-known scenes in Europe and America had been shown, interspersed with some very curious revolving chromatropes, and an ocean scene which was particularly impressive, a few very comic movable figures were introduced, which created considerable merriment among the fair ones of the white-robed retinue sitting to the left, though they were very subdued and dignified in their expression of it. But I did not consider it in good taste to show too many ludicrous views, for it would hardly be compatible with the dignity of the occasion, so thirty or forty slides were omitted. As it was, however, the exhibition lasted one hour and twenty minutes, and though they seemed a little disappointed that it ended so soon, I thought better to make it too short than too long. It was on the whole quite successful, and seemed to give pleasure to all concerned. At the conclusion I raised the lamp out of the instrument, and turned the full blaze of light down the corridor, while the procession of fair ones and officials passed quietly out, two by two; and it was really a very pretty sight, and one rarely seen by an outside individual, much less a foreigner. The Mikado and Empress, of course, passed out first. The officers of the Kunaisho expressed much pleasure and gave many thanks for the pleasant evening all had passed; and then I was led, with Hatakeyama and my two Japanese assistants, into the little room where the Mikado's ministers are usually received personally. Here refreshments were awaiting us, and after a little talk and congratulations for our success we rose to leave. The Mikado, and especially the *ladies* of his household, have since expressed great pleasure in all the sights they saw; and I'm sure it was a great pleasure to me, personally, to have the privilege of affording them enjoyment.

From the same "quarterly" we extract a brief article on the stereopticon, which, it will be seen, is merely another name for a magic lantern of the better class—a name, however, which is quite inaccurate in a scientific sense:—

The word "stereopticon" is derived from the Greek *stereos*, firm, and *optikos*, having reference to sight; and is believed to have been first applied to magic lanterns by Dr. R. Shelton Mackenzie, the distinguished author and literary critic of the *Philadelphia Press*. It means *to see solid*, and from its resemblance to the stereoscope has been sometimes tortured into that ungraceful word "stereoscopticon." It should never be applied to lanterns using other than the oxyhydrogen light, because the most intense illumination is required to produce this appearance of solidity, which is most remarkable in statuary where the background has been blacked and the figure appears to stand out in relief, and in public buildings, streets, &c. The principle on which the stereoscope depends is not of modern invention; it was known by Euclid, B.C. 300, and was described by Galen in 174. The first stereoscope, however, was not made until 1851, when Duboscq, of Paris, delighted the world with this wonderful optical instrument, which Professor Wheatstone, of London, was the first to explain. He showed that every *solid object*—such as a tree or building—is different with every changed position of the eye. Thus, two slightly-different pictures of any solid object will be simultaneously impressed on both eyes. The combination of these two dissimilar visual images thus depicted on the two retinæ convey to the mind the idea of relief or solidity. In accordance with this law stereoscopic views are made by taking two pictures of the same object by lenses placed somewhat apart. The two scenes thus obtained are united into one by viewing them through two semi-lenses, whose centres are usually two and a-half inches apart. The result is, of course, an optical illusion, for we do not see a solid object; we only think we do. The paper is perfectly plane. And the same law applies to the projection of a *single* picture by the stereopticon. Dazzled by its light, lines, and shadows we seem to see solid objects in relief. Certain purists have objected to the use of the word "stereopticon," because, *theoretically*, a stereoscopic effect cannot be obtained from one picture. But what are these theories worth when practice demonstrates that one picture, thoroughly illuminated, is sufficient? The looker-on who has gazed wistfully up a Parisian boulevard, or with curiosity beheld a street in Pompeii, or with admiration peered through the richly-sculptured corridor of a castle in France or a convent in Spain, can with difficulty convince himself that these are but semblances of things far away, so real do they appear; and he will unhesitatingly admit the force and propriety of calling the magical instrument a "stereopticon."

Our intelligent friend, Mr. J. A. Todd, of Sacramento, whose acquaintance we made three years ago, and whose pictures were so well received at the London Photographic Society's Exhibition of that period, contributes to the *Philadelphia Photographer* a few remarks suggested by the editor's offer of a prize for the six best negatives of a certain kind. From these we make an extract:—

You have (Mr. Todd says) often impressed upon the minds of your numerous readers the importance of more studious attention to art principles in the practice of general photography, and more varied attention to posing, lighting, and accessory effects. In many other branches of art this is nearly always possible, but in photography it is only practical in very exceptional cases. Undoubtedly the most tutored of our patrons are apt to admire a nicely-posed head, a graceful display of pretty hands and arms, even down to upholstered chairs, backgrounds with windows in the corners, vases, pillars, curtains, &c.; but my experience has been so far that in nine cases out of ten the photographic subject objects to what he terms "make-ups" (call it what you will), to obtain an effect that is foreign to the idea and condition of the person that is expected to pay you for your labour. Remember, I am speaking from a country town. I often wish that all this was different—different in many ways; different all through; different in regard to price for faithful services rendered; different, so that a more respectful consideration might be paid to the suggestions we make; different, so that more credit should be given us for using our best endeavours to make the most of the subject in hand; different, so that we could build up or scratch out after the subject had vanished; different, so that the good public would have more faith in our experience and common sense. The sculptor takes license with his patrons' ideas in a manner that would bankrupt any photographer. Even though justified by what is often termed high art principles, and other higher sounding phrases regarding light and shade, &c., only just think for a moment of the effect of art or art rules applied in this kind of tableaux:—Customer, "I want my 'dogtype' tuk. How is your charges? Well, that suits; fire away." "Certainly, sir; please take a seat," or a stand, as the case may require; that is, pose him. Turn him this way and that way, so as to make the best of my common, not unusual, customer. He has very likely just come from the barber's shop, so be careful about touching his wet, greasy, shining hair. His standing white collar makes it almost impossible to turn his head without injury to his throat. Finally, hang a cloak around him (example: Lincoln's statue in Union-street, New York); do you think he would like it? He has his notion about a "pictur," and he has to be suited if possible; that is, if you expect to live from the process of picture-making by the photographic process, and yet the above class of customer is the very life-blood of our business. I mean, from such like we get the most profit—money. They seldom require a sample print, nor do they ever wish to take counsel of a friend before they themselves are satisfied.

Writing in the *Philadelphia Photographer* on the subject of "Reversed Negatives," and *apropos* of an article in the *Mosaics* bearing this title, but about which, not having seen it, we are unable to speak, Mr. I. B. Webster says:—

It is now many years since I was first called upon to photograph a daguerreotype view which showed all the signs with letters reversed, as all opaque plates do when taken direct in the camera. Of course, we picture men all understand this without my explaining it. In the photograph the negative steps in between the original and the print, and turns everything back to the first position. This being true, how will we turn back on paper the reversed letters on the daguerreotype? If we proceed in the usual way, the negative will impress upon the paper the reversed letters again. The virtue of the *Mosaics* process referred to consists of its thinness, rendering it easy to print from either side of the negative. It, however, is too complicated for the limited demand of reversed negatives, and we propose to resort to a more simple way. It can be done by placing the original in front of a mirror, so placed as to allow the camera to bear upon the reflection in that mirror, which position is not always attainable. My brother invented an attachment, to be placed upon the hood of the tube, containing a reflector, which was a perfect success in making signs read right (and cipher) upon the opaque plate. This was in 1852. We always used one of these in taking views until the photograph was introduced. The principle that produced that effect is identical with that of the reversed negative. The most simple way to produce a reversed negative is to place the prepared plate in the shield with the coated side towards the back of the camera, thus allowing the light passing through the tube to carry the image through the prepared plate, and impress it upon the prepared surface of the said plate, then the farthest from the tube. I am prepared to hear several objections raised by some about not being able to get a good focus, or a failure to see how it is possible to hold the plate in the shield, on account of the springs upon the shutter of the shield, &c. I will meet you upon these points right at the threshold by telling you how to do it. First, how to focus:—Try and select a plate about the thickness of your focussing glass (you need not be particular to a hair's breadth). Proceed to arrange for your copy just as you would for any other copy. When you come to focus, turn your ground glass over by taking it out of its frame and putting it back, so as to have the ground surface towards the back of the camera; then replace the frame in the camera, and proceed to draw the focus. Second, to safely carry the prepared plate in the shield:—After carefully placing it in the shield (face up), put a very small piece of blotting-paper right on the prepared surface at each corner, after which lay another glass the same size as the prepared one on to it. The pieces of blotting-paper at the corners will keep these two glass plates from coming in contact, and the back plate will prevent the spring on the door injuring the prepared surface. Now shut up your shield, go on and make your exposure, and when you return to the dark room to develope do not forget that the plate is in the shield wrong side up. I have made many a reversed negative this way, and saw no difference in the result, other than that it was reversed—just what I wanted.

CHEMICAL MANIPULATION.

In your *(Practical Photographer)* bureau of information is a German formula in which the toning bath contains half-a-grain of chloride of gold to each fluid ounce. I would characterise this as a horrible bath. If the German artists use such a toning bath as this it is no wonder they asked H. Rocher, of Chicago, for his formulæ. According to my experience it would tone so fast that it would take half a day to tone a fair day's printing, and it would be impossible to produce a batch of prints any way near an even or uniform tone. Why? Simply because it is about eight times as strong as it ought to be, and about twenty times as strong as some of our best printers use. I formerly used one grain of gold to sixteen fluid ounces of bath, and my prints toned so fast that I could not manage more than six or eight at a time. When I visited Chicago, in 1874, I was surprised and delighted with their brilliant tones; being known as one of the old fogies from the daguerreotype times, I was at once admitted behind the scenes, and to my intense surprise I found men toning with from fifty to one hundred prints in the bath at once. I looked on in amazement, expecting to see some prints reach the old blue-black tone before they could be got out of such a mass, but no such thing occurred. The reason was the prints required from fifteen to twenty-five or thirty minutes to tone, and the tones were beautifully uniform. I remember when I published the albumen process in 1861 to have stated that one grain of gold was sufficient for a sheet of paper. When the journal was received in Rochester, N.Y., where I then was, the leading operator called on me and swore roundly I was a fool or a liar, he did not know which, because his experience taught him that a sheet of albumen paper required three grains of gold. In 1874 I called on the same artist, now doing a splendid business in Detroit, Mich. I asked how much gold he now used. He replied that his toner calculated one grain of gold for one hundred card prints, or about one grain to three sheets, as it is usually cut. Try to precipitate nitrate of silver with a strong solution of chloride of sodium, and notice the grossness of the precipitate. Next take some of the same silver solution and add a weak solution of chloride, and notice the result; the precipitate will be fine. Or try to do silver plating with a strong cyanide solution; the result will be rapid coating, but it will flake off, whereas if the coating be done in a weak bath it will work slow but sure, and will be as firm as if it were not plated but solid metal.

As I do not believe in denouncing any formula without offering what I conceive to be a better, I will here give one that has stood the test of ten years' everyday practice:—

Silvering Solution.—Soft water one ounce, nitrate of silver forty grains; float from thirty seconds to two minutes, according to temperature and the requirements of the particular sample of paper in use. When dry fume until it prints a rich purple black, slightly bronzing in the deep shadows—say fifteen minutes as an average; wash in four changes of water, *no acid*, but to the fourth water add sufficient salt to make the prints decidedly red. This salt has a double effect—first, the red colour it gives to the print enables the toner to decide at once when the colour he wants is reached; second, and most important, it changes any free nitrate which the washing has left in the prints into chloride—a very important item, because a very little free nitrate will precipitate the gold from the toning bath. Soft water for the first washing is also important; if water containing lime, commonly known as "hard water," be used a scum of chloride of silver is apt to form on the surface, which colours with great rapidity in the toning bath, often leading the novice to suppose his print over-toned, while really scarcely begun. In consequence, when immersed in the soda it is instantly dissolved, leaving the blue-black print brick-red.

I make my own chloride of gold by dissolving twenty-five grains of dentist's waste gold in acid nitric C. P. sixty minims, acid muriatic C. P. 120 minims. This will give a solution of which you know the exact value. Dilute to twelve and a-half ounces with soft water. If the acid does not dissolve all the gold add more until the gold is entirely taken up, but in diluting keep it to twelve and a-half fluid ounces. This gives a solution containing two grains of gold per ounce. Take of this solution one-quarter fluid ounce, equal to one-half grain of gold; soft water sixteen ounces; neutralise with a saturated solution of bicarbonate of soda, and use at once. Washing soda will do, but I prefer the bicarbonate. Any required tone can be obtained with this bath, from blue-black to chocolate brown, which is at present a very popular tint. Do not throw away the bath when used, but when next wanted decant the clear liquid, leaving the precipitate in the bottle. Add gold from the stock solution, and neutralise. Some other time I will tell how to utilise the precipitate. Fix in hypo. one part, water six to eight parts; keep moving for fifteen to twenty minutes, and then wash.

I will also give a developer, not because it is so much better than any other, but because I make it "different from white folks." Take a wide-mouthed quart bottle (a fruit jar answers well), make a bag of very coarse muslin (Swiss double is first-rate) large enough to hold eight ounces of protosulphate of iron, *weigh* your iron and put it in the bag; now let the bag into the mouth of the bottle, and with a rubber band fasten it so that the iron will remain just even with the top of the bottle. Fill up with *soft water*, and set it aside while you go on with other business; by-and-by you will find the bag empty and the iron all gone to the bottom. Stir it up and spread the bag over the mouth of the bottle to keep out dust. This is the stock solution, and contains a quarter of an ounce of iron to each fluid ounce. For ordinary use take four ounces of stock solution, twelve ounces of soft water, one ounce and a-half of acetic acid No. 8, and half-an-ounce of alcohol. This gives a developer of twenty-four grains per ounce. For redeveloper take of stock solution one ounce, citric acid half-an-ounce, water fifteen ounces; grind the citric acid in a mortar with a little water and add to the iron, then fill up with the rest of the water. (Of course every photographer knows that a little silver must be added to the redeveloper before using.) *Soft water must be used.* If hard water be used the silver on the plate is instantly changed to chloride, and development ceases, giving thin, worthless negatives where first-class negatives might as easily be obtained.

With this stock solution I can mix a pint or quart of developer in two minutes—strong or weak as circumstances require. I take a bottle that will hold twenty ounces fluid measure, cut a strip of white paper half-an-inch wide and long enough to reach the top, paste this on the side of the bottle, and when dry measure four ounces of water into the bottle, and on the paper mark its surface; repeat and mark at 8, 12, 16, 17, 18, 19 and 20 ounces. Varnish this paper with negative or positive varnish and it will last until the bottle breaks. I never put iron solution into a graduated bottle if I can avoid it, and by this plan I never have occasion to do it.

In regard to collodion: where only a small business is done I have a plan not new but good, which I have practised almost constantly since 1865; it only needs to be tried to be adopted in every small gallery:—

Ether, sulph. con., twenty ounces; alcohol 95, ten ounces; cotton, 200 grains; put the cotton in the bottle and add the alcohol, shake well, so as to thoroughly wet the cotton, then add the ether. If the cotton be good it will leave no precipitate, and will settle perfectly clear. It will keep indefinitely. This I call plain collodion.

Sensitising Solution.—Alcohol, ten ounces; iodide of ammonium, 200 grains; bromide of cadmium, eighty grains, or, alcohol, ten ounces; iodide of ammonium, 150 grains; iodide of cadmium, sixty grains; bromide of cadmium, eighty grains. Dissolve the iodide and bromide in the alcohol by grinding in a glass mortar, and filter into a tall narrow bottle. This will keep indefinitely. When collodion is wanted, decant three ounces of plain collodion and add one ounce of the sensitising solution. It will be fit for use immediately, but will be at its best in twenty-four hours. By this plan there is no old collodion standing by. Old red collodion may be renewed by setting a strip of clean, scoured zinc into it; in a day or two a precipitate will be formed on the zinc, and the colour will be nearly or quite gone. This makes good ferrotype collodion, but is not so sensitive as new. LITTLE CARBON.

Meetings of Societies.

THE PHOTOGRAPHIC SECTION OF THE AMERICAN INSTITUTE.

AT the June meeting of this Society Mr. H. J. Newton, the President, occupied the chair. The minutes of the previous meeting having been read and confirmed, some formal business was transacted.

The SECRETARY: I received some time since a communication from Mr. J. Solomon, of Red Lion-square, London, as follows:—"I beg you will try the enclosed non-actinic cloth as a substitute for non-actinic glass for chemical rooms. If you require a few samples for distribution I shall be happy to forward them," &c. Here are the samples. I had them some time before I could test them. I prepared very sensitive paper and exposed pieces to bright sunlight under the non-actinic cloth, and I exhibit the pieces so exposed here. I may say that I selected the time of exposure in the afternoon between three and half-past three o'clock, as I find that in New York City the light is strongest in actinic force at that time.

Mr. CHAPMAN: In what position and under what light were those experiments tried?

The SECRETARY: In a south window, the bright direct sunlight not passing through glass. This piece, No. 1, was exposed three-quarters of an hour. You will see no effect of light through the cloth. This other piece of paper, No. 2, was exposed fifteen minutes.

Mr. CHAPMAN: The thick cloth is too red. Light passing through it would, I should judge, be very trying to the eyes.

Mr. BROWN: You will find canary-coloured tissue-paper is the best for ordinary light; it may be used in more than one thickness if necessary.

Mr. MASON: Mr. Bierstadt used yellow paper known as "post wrapper." I hardly think the red would be so pleasant to work by, though it is effectual in stopping all, or nearly all, the actinic rays of light.

The PRESIDENT: I have of late talked of emulsion so much at these meetings that I feel a little reluctant about saying anything more in relation to it. I feel as if it would be better for some one else to say what is to be said. In order to enable Mr. Mason to corroborate my statements in regard to emulsion, and to dispel the idea to a certain degree prevalent that it is a fiction of mine in some way unaccountable, I took a bottle of emulsion over to Mr. Mason's studio at Bellevue Hospital yesterday morning between nine and ten o'clock, and asked him to sit me for a picture and use his bath. He did so, and sat me fifteen seconds and produced this negative (exhibiting). I then prepared an emulsion plate and asked him to give me a sitting with an exposure of two seconds, which he did, and the result was this negative (exhibiting). Then he tried his bath again, giving four seconds' exposure, and produced this negative (exhibiting). You will notice there is very little image seen on the last plate, except in a few parts of the high lights.

Mr. MASON: I can fully corroborate these statements. Mr. Newton came to my studio yesterday morning at half-past nine and asked me to make a negative with a bath plate by my ordinary working process. He told me he wished to try comparisons with his emulsion, which he had with him. I made negatives exactly as he has stated here—one in fifteen seconds, as you see here. Then he prepared a plate, the preparation being very simple, and requested me to give an exposure of two seconds. We used the same instrument and the pictures were made one immediately after the other—the same position and conditions. The emulsion picture, as you will see, shows the greatest amount of exposure. The difference seems to be very great, and if the emulsion can be made successful—and I have no reason to suppose the contrary—I shall certainly adopt it, as a great deal of my work, being upon people who are in pain, necessitates short exposures; and if I can get a picture in two seconds which now requires fifteen seconds it will be a great improvement. Is is certainly as simple, and in many respects for my work it will be more simple, from the fact that I can keep the emulsion plate ready prepared, which is also an important point. I must say that this demonstration, coupled with others which I have made myself and which I have seen Mr. Newton make, has convinced me that emulsion really is a vast step in advance of anything we have ever before had. The only question which arose in my mind was in regard to the stability of emulsion, from the fact of its being a compound made out of the usual order of our work and requiring careful manipulation in its production. I see no reason why, under Mr. Newton's method, the wide-awake photographer should not be able to compound an emulsion with as great certainty of its working as he would find in the manufacture of collodion. Of course there are some compounds used in the making of emulsions which are simple, but not well known to the majority of photographers.

Mr. CHAPMAN: There is no question in my mind about the emulsion; I have had experience enough in that matter to assure me of its great value. But I have never used it in my special work, because it is of such a character that you cannot see the image when you are developing. In my case there is nothing to be seen by the unaided eye.

Mr. NEWTON: With the emulsion as I now make and develope it the image is as distinct by reflected light while developing as the image on a bath plate. It is, in fact, more brilliant and distinct as a positive than by any other process with which I am acquainted.

Mr. CHAPMAN: That is exactly what is wanted; previously there were no means of determining when to stop the development, from the fact that by the processes which I have worked the image was nearly visible, except by transmitted light. As to solar work, there was plenty of light. I did not require a quick process, because we had light enough; but with lunar and stellar work it is different, there being times when it is of the greatest importance to have rapidity. The only trouble I have had with emulsion has been in the preservatives. Emulsion dry plates, when developed within a few days after exposure, in my case have been exceedingly fine and good, and as quick—not as quick as desirable; but then it was within a reasonable time of exposure—twenty, thirty, or forty seconds' time. This was out-door work. But after the plates remained from four to eight weeks after exposure, in every case it was almost impossible to bring out a vigorous picture with the alkaline developer. I could save the plates, however, by simply bringing out a very light outline of the image with the alkaline developer, and then complete the process by the use of acid pyro. and silver. Since then I have learned that by adding gallic acid to the preservative these plates will keep after exposure. I think I may go out on the Eclipse expedition, and in that class of work we are going to attempt a new order of things. The attempt is to be made to photograph the spectrum of the corona of the sun while in a total eclipse. We were once very well satisfied to get the picture of the corona; but now they are going to stretch that out and separate it into its different wave lengths and photograph the different portions of it, and for this reason it is a matter of the greatest importance to have the utmost sensitiveness. Some experiments have been tried on photographing the spectrum from the moon, to see how weak a light may be photographed. If this bath of Mr. Mason's was as good as the ordinary baths that photographers use, and I have no doubt it was—his experience in this matter, of course, none of us doubt—here are two negatives, one made in fifteen seconds, the other in two seconds, one-seventh of the time, and showing at least double the exposure, or effect of light, as nearly as I can estimate, which amounts to a sensitiveness equivalent to about fifteen times greater. It seems that one second with the emulsion would give as much detail as the fifteen did on the bath picture; and this emulsion of Mr. Newton's, I understand, is of a permanent sensitiveness, which will continue as long as the material lasts.

Mr. NEWTON: Perhaps I have one hundred different samples, all labelled and dated. I recently found a sample of April 6, 1876 (two years old last April), and tried it; it worked as fine as any emulsion you ever saw, though it was not so sensitive as some made by my recent formula.

Mr. MASON: In regard to any special manipulation about this emulsion work, I have seen nothing difficult. Of course Mr. Newton developed the emulsion plate here shown; but he was not very particular with the material, using that which was in my place without any special proportion. There was nothing further in the manipulation than what he has told you, except that he brought with him what he calls his accelerator; that he will probably give you to-night.

Mr. Newton: I spoke of the way in which this extreme sensitiveness is produced at one of our meetings in the winter—in February or March. The plates are flowed before exposure with a modified alkaline developer. I experimented to get the minimum amount of bromide in this modified accelerating solution. The compound I now use for this purpose is as follows:—Water, twelve ounces; carbonate of soda, 180 grains—that is, fifteen grains to the ounce; and two grains of bromide of ammonia to the twelve ounces. That is a homœopathic dose, but it is effectual. If you use the soda solution without that small quantity of bromide your plate will be fogged after exposure—that is, it will fog all over during exposure; but two grains of bromide are sufficient to restrain all tendency to fog, and you get all the advantage of the alkaline condition without any unnecessary restraining action. This accelerator increases the sensitiveness of any wet emulsion plate from four to six fold.

Mr. Chapman: You mix your developer for each plate?

Mr. Newton: No; I take six ounces of carbonate of soda and dissolve it in a quart of warm water. That is a stock solution. Now take an ounce of this and add ten or twelve grains of bromide of ammonium and four ounces of water. When the bromide of ammonium is added to the soda solution there will be a strong smell of ammonia, by the liberation of ammonia when the carbonate of ammonia is formed. When I develope a plate I take enough of this solution to flow it and no more. Perhaps I ought to say something in reference to the ferrous oxalate developer. It is not quite clear in the minutes. The ordinary way of making the ferrous neutral oxalate of potash had been by making two separate solutions of the potash and the oxalic acid and putting them together; but in simplifying it I merely made a solution of the potash and added the oxalic acid in crystals, to save one operation. I think I stated that I used all the way from five to thirty-five grains of the protosulphate of iron to determine about the best quantity, and found fifteen to twenty grains to the ounce of oxalate of potash solution was sufficient. It dissolves very quickly and forms a ferrous oxalate, which turns the solution a deep orange colour. I have further simplified the manufacture of the oxalate developer by making it acid at the time of compounding. This obviates the necessity of any further manipulation for acidifying. When the solution is so prepared it is only necessary to add the iron as before stated and the developer is ready for use. Prepared in this way I obtain all the intensity desired.

Mr. Chapman: Would you recommend the use of this ferrous oxalate developer instead of the alkaline developer?

Mr. Newton: My experience with the developer has been so limited that I cannot well give a decisive answer to the question. It produces no fog and you can use it repeatedly; that is a great advantage. It gives very fine detail in all the weaker lights; that is very difficult to get by any photographic process, and not have the high lights overdone before you get the shadows done enough. From my experience up to this time I feel justified in saying that it promises to be the developer of the future for emulsion plates.

Mr. Chapman: I am much encouraged now by seeing these negatives; I think this is going to be the direction to work in.

A motion was put and carried that the President and Secretary be authorised to prepare the minutes at this meeting for publication.

The Section was then adjourned until the first Tuesday in September.

Correspondence.

TRANSPARENT POSITIVES BY THE NITRIC ACID PROCESS.

To the Editors.

Gentlemen,—I was very glad to read your article the week before last on the above process, and shall hope to find it useful to me whenever I can experiment in this direction again. Meanwhile, I will endeavour to add my mite of experience to the general fund.

I may premise that I am not fond of operations in which nitric acid is concerned. I do not like the fumes of nitric oxide which arise. I took my precautions, however, to reduce the unpleasant effects of these to a minimum.

In my first trial with one or two plates, a considerable time back, I used those which had been prepared with the Liverpool emulsion. Notwithstanding the precaution which I always take of edging with india-rubber solution, I found the film became very tender and liable to slip after treatment with nitric acid. I resolved, therefore, in any further experiments, to apply some kind of substratum which would not be injured by the nitric acid. It seemed to me that albumen might be best adapted for the purpose. Accordingly, in my more recent experiments with dry plates, a certain number were prepared with this substratum and the Canon Beechy emulsion, which I was using at the time. Two plates were always exposed on the same subject. Of these one was developed into an ordinary negative, and the other made, by the nitric acid process, into a positive, to be kept for enlargement at a future time. The strong nitric acid was diluted with about an equal bulk of water. Many of my negatives after a full exposure had been developed rather far, with the object of printing from them without further intensification. Those intended for positives I developed rather farther still; either because I had read that the development ought to be very complete, or because I thought that unless in the high lights the development were carried right through the film the whole of the silver bromide in those parts would not be reduced and removed by the nitric acid, and the portions which remained would be reduced in the second development, destroying the transparency of those portions. I soon found, however, that this precaution had been carried to an extreme, and that such large portions of the silver bromide had been reduced and dissolved out that on redevelopment considerable portions of the plate were left bare, with a deficiency of detail in the remaining portions.

In the next trial I was careful not to push the development nearly so far, and then I found, what I had endeavoured to avoid in the first instance, that in no part of the film was the whole of the silver bromide reduced and dissolved away; but, besides what was required to form the positive image, there remained, as it were, a veil of bromide through the whole film. In developing again, however, I took care not to push the operation too far. Then I used the fixing solution, as with ordinary negatives, and had the pleasure of seeing that this veil was almost completely dissolved away by the hyposulphite; any slight portions that remained on one or two spots arose, it seemed to me, from an undue thickening of the film in those parts, owing to imperfect preparation of the plates from want of convenience. Except for this the best results were just what I was wishing them to be. I think, perhaps, that next time I may be able to secure this with more mechanical certainty by adopting your precautions of a developer of measured strength, and a limited exposure adapted to that developer.

So far as I can judge the Beechy emulsion appears to lend itself admirably to the process. With the full exposures which I give I use in the developer a smaller quantity of the carbonate of ammonia than that prescribed. After treatment with nitric acid I gave the plate a thorough washing, and then flooded it with water to which a few drops of the solution of carbonate of ammonia had been added, in order completely to neutralise any remains of nitric acid in the film. The plate, after standing to dry, was put away in the plate-box, that the remaining operation might be afterwards more conveniently performed by daylight.

The re-exposure took place from my bedroom window, and I found that by shielding one part of the plate behind the window-frame while the other part projected into the light, enabling me to give one part a fuller exposure than another—and also by keeping the developer more in one portion than another—I could modify the result which would otherwise be obtained.

I give these particulars thinking they may, perhaps, be found useful by others serving their apprenticeship like myself, and glad, as I am, of any hints that may be thrown out.

I will now only trespass a moment longer to mention a typographical error in what I wrote last week. In page 370, first column, line 29 from top, for "I would intensify to opacity" *read* "I *could* intensify to opacity."—I am, yours, &c., Wm. Washam.

Eastbourne, August 6, 1878.

LOMBARDI *VERSUS* VANDERWEYDE.

To the Editors.

Gentlemen,—I had intended to let Mr. Vanderweyde "cook his own broth." He, however, regardless of accuracy, the respectability of the parties concerned, and of his own documentary evedence, has rushed into print and endeavours to mystify facts.

Allow me, therefore, in reply to his communication in your last issue, to say that I was present at the hearing of my cause before the judge in chambers, who, on reading Mr. Vanderweyde's affidavits, said at once that they were contradictory on his own showing, and that there was no defence to the action. Mr. Justice Field thereupon ordered the full amount claimed to be paid into court within ten days. The defendant appealed, and your readers know with what success.

Mr. Vanderweyde says that he had no time to speak to his counsel. Considering that three months elapsed between the application in chambers and the hearing of the appeal, I leave it to your readers to draw their own conclusion respecting his assertion.

Now about his letters. The defendant, being without funds, gave me an I.O.U. on the 17th March, 1876. I applied several times for a settlement, but ineffectually. Three weeks afterwards I placed the matter in the hands of the Trade Protection Society. The defendant asked for particulars of the claim for £76 14s. At the end of April he got them, but took no notice. On May 10th, 1876, the solicitor of the above society applied for the amount. The defendant wrote admitting the debt, but asking for further particulars, which were supplied, and he took no further notice of the matter.

From inquiries instituted two years ago I found that the defendant was unable to pay the amount of the I O U. At the beginning of this year, however, I was informed that he had formed a partnership with Mr. Willing, and had succeeded in establishing a first-rate business in Regent-street. I called at once on the defendant, who informed me that he was in a very good position, that he had no partner, that he had just escaped from the danger of Mr. Willing becoming his partner, and that he had secured furniture and lease for twenty-one years.

I offered him my hearty congratulations, and joyfully presented to him his I O U, fully hoping in the success of my application. I was disappointed, however. The man of genius, the inventor of the electric light, the major of the American army of secession refused to honour his I O U. I felt then that as long as he was poor and could not pay he had admitted the debt but pleaded poverty; now, however, that he was successful, rich, and powerful he was willing to dishonour his I O U, and frightened me with an expensive lawsuit. I was not afraid to face a searching cross-examination before a jury; for, although at a very great expense and personal discomfort, I felt I had a duty to discharge towards myself, my family, and my photographic brethren.

The fact of the defendant's case breaking down so abruptly without my counsel even saying a single word; the fact of the defendant's counsel throwing up his brief, and apologising for himself and the gentleman who had instructed him for having undertaken such a defence; the fact of the judge turning round to, and directing, the jury to return a verdict for me for the full amount claimed with interest—I hope such facts will serve as a good lesson to all concerned that "honesty is the best policy."—I am, yours, &c., A. LOMBARDI.

Brighton, August 6, 1878.

[On the principle of giving fair play to all parties in a dispute, we have admitted the explanatory letters of both defendant and plaintiff in this case. Here it must now rest.—EDS.]

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Wanted to exchange, *Blackie's Encyclopedia*, quite new (£7 14s.), for good portrait lens, &c.—Address, MASTER, National School, Blyth.

Wanted, a whole-plate or 10 × 8 bellows camera, in exchange for a well-made, large box tent.—Address, G. PRATT, 32, Kennett-road, Harrow-road, W.

A dark box on wheels, size 25 × 18 × 13, weight 42 lbs., value £2, will be exchanged for a whole-plate view lens, or anything useful in photography. Photo. three stamps.—Address, W. PHELPS, photographer, Dartmouth.

A telescope, by West, London, 3 feet 6 inches long, 2¼ inches object-glass, rack adjustment, with pillar and claw stand, all brass, with Spanish mahogany stand, cost £10, is offered for a modern Ross or Dallmeyer portrait or rectilinear lens.—Address, F. MASON, 45, Treverton-street, N. Kensington.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED—

John Beringer, Helston.—*A Photograph of the "Nautilus."*

John Owen, Newtown, North Wales.—*Two Interior Views of Montgomery Church.*

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

W. SUTCLIFFE.—Send an addressed envelope for private reply. The list you enclose is not sufficiently comprehensive.

F. R. M. S.—It is probable that Mr. Jabez Hughes's *Manual* will answer your purpose quite as well as any other. It is published by Mr. J. Werge.

W. W.—After removing the free sulphur you need not entertain the slightest fear that the use of the glove will cause fading. It is returned as requested.

JAMES BURNSIDE.—There is no doubt that the principle of the safety lamp could be applied to the electric light. We are not, however, conversant with the details of the subject.

M. R. O.—To use the front lens of the combination alone it must be reversed, the flat side being placed towards the landscape. It is also imperative that a diaphragm be employed, which must be placed outside the lens.

L. M. CLARK.—The yellow incrustation is persulphate of iron, caused by exposing the protosulphate to the air. To avoid the formation of this salt care must be taken to keep the bottle containing the protosulphate well stoppered.

BENJAMIN HOTSON.—The values of the two diaphragms are respectively $\frac{f}{12}$ and $\frac{f}{21}$. Neither is sufficiently small for copying engravings of the dimensions proposed. It will be advantageous to reduce the aperture to the fortieth part of the focus of the lens.

A. W. W. B.—Having tested the mount we find that it contains a large proportion of hyposulphite of soda, which has, doubtless, been used by the paper-makers as an antichlor. You must immediately discontinue making use of that sample and obtain another, otherwise your reputation will be seriously jeopardised.

A. M.—We regret our inability to give such a lesson as you require. What is worse, we are not aware of anyone in this country to whom we can recommend you to apply. Those who are competent to teach such a process entertain a decided objection to imparting any information concerning it. We shall make inquiries, however.

A PROVINCIAL.—There certainly was a patent granted for enamelling paper photographs, but this was fourteen or fifteen years ago, and if we recollect rightly it expired at least twelve years since. Hence you have been partially misinformed; at any rate, you have nothing to fear from indulging in this department of photography, either as a trade or a pastime.

W. L. R.—To the glycerine and nitrate of silver solution at present made use of by you add a considerable proportion of kaolin; shake well together and expose the mixture to strong sunlight. It will rapidly become dark, but will soon begin to clear again, commencing at the top. When the whole of the discoloured kaolin has subsided decant the clear portion for use. This is applied to the plate after its removal from the nitrate bath; allow to flow well over every portion of the surface, drain, and place the plate in the dark slide. The plate will remain good for several hours.

CAUTION TO PHOTOGRAPHERS.—The profession and dealers are cautioned with regard to a thief who is going round purloining anything photographic he can lay his hands upon after being admitted on any premises on a plea of charity or starvation. He is a photographic printer, an American by birth, about 5 feet 9 inches high, about 24 years of age, dark complexion, black hair and eyes, thick eyebrows, slight black moustache, wears light tweed suit and a black hat. There is a warrant awaiting him at Bristol for stealing about £120 worth of lenses from Mr. Protheroe, photographer.

"ONE IN A FIX" writes:—"Can any of your numerous readers tell me what ink to use for collotype plates—the name it is called by the trade or its composition? Also, what condition should the plate be in just previous to inking? and should the ink be dabbed on or rolled on? Should the ink be applied all over the plate previous to developing in water, or is the bichromate to be washed out and the plate dried, and then slightly damped and inked? I refer to gelatine surfaces with the natural half-tones of nature. Will simple gelatine and bichromate be sufficient, or does it require other ingredients? Any light thrown on these queries will much oblige."

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.—The committee of this Society have arranged to hold the summer outdoor meeting at Bolton Abbey, on Wednesday next, the 14th inst., to be a full-day excursion, to meet the Sheffield Photographic Society. Members are desired to make their own arrangement for arriving at Ilkley in the morning, where conveyances are always in waiting for Bolton Abbey. A knife-and-fork tea is to be provided at Ilkley, about six p.m., of which due notice will be given to those intending to join the party.

THE BRITISH ASSOCIATION.—From all quarters we learn that the forthcoming meeting of the British Association, which commences, at Dublin, on Wednesday next, is expected to be one possessing an unusual degree of interest. We have received the following circular, which we cordially commend to the notice of our readers:—"I am directed to inform you that a *conversazione*, to which the members and associates of the British Association have been invited, will be given by the Royal Dublin Society on the evening of August 15th, and that on this occasion every facility will be given for the exhibition of objects of interest in science and art. The committee will take great care of all objects entrusted to them, and the cost of carriage to and from Dublin will be paid.—Richard J. Moss, Registrar." Photographs and objects of interest intended for exhibition should be addressed—"The *Conversazione* Committee, Royal Dublin Society, Kildare-street, Dublin."

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

For the two Weeks ending August 7, 1878.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

July.	Bar.	Max. Tem.		Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
		Sun.	Shade.					
25	29·67	101	70	59	60	61	W	Overcast
26	29·72	106	75	56	59	64	W	Bright
27	29·85	104	75	59	59	64	NW	Bright
29	30·03	109	75	55	59	63	W	Overcast
30	30·14	104	71	53	59	63	N	Bright
31	30·32	83	68	56	59	62	NE	Cloudy
August.								
1	30·31	103	75	55	55	59	E	Cloudy
2	30·00	112	75	55	57	58	NE	Raining
3	29·70	99	69	57	60	63	E	Cloudy
5	29·78	117	83	58	60	62	SE	Cloudy
6	29·71	113	76	60	65	67	SE	Overcast
7	29·80	——	—	60	63	68	W	Cloudy

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 954. Vol. XXV.—AUGUST 16, 1878.

"INCREASING THE SENSITIVENESS OF DRY PLATES."

Mr. Herbert B. Berkeley's article in our last number, on *Increasing the Sensitiveness of Dry Plates,* brings to our recollection certain peculiarities of a similar nature which we have from time to time noticed in the behaviour of various emulsions. The phenomena we have to describe have been witnessed—many of them—at wide intervals, and in the almost entire absence of any means of comparing notes; hence we have not been able to trace them to any common cause, nor, indeed, do we imagine that they arise, strictly speaking, from the same or even similar causes in different instances. The cases we shall mention, however, possess one noticeable feature in common, namely, a defective emulsion which is capable of giving an improved result under treatment which, with an originally good emulsion, produced no apparent alteration.

There are numerous ways in which an imperfectly-prepared emulsion (we speak of washed emulsions) has shown this tendency to improvement, amongst which we may mention the washing of the film before drying, the application of an organifier as in Mr. Berkeley's case, and also the addition of various substances to the emulsion itself. The substitution of a smaller quantity of plain collodion for an equal bulk of the plain solvents we have found, in many cases of defective "pellicle," to work a great change for the better in the quality of the emulsion; while in at least as many instances, both with good and bad pellicle, it has proved entirely without effect. What may be the true explanation of this partial behaviour we do not offer to explain; but it would certainly seem to point to the supposition that the purely physical character of the film of collodion has a great deal more to do with the photographic result than is imagined by many.

A curious part of the business is that rarely (we have noticed but one instance where such is the case) does the same emulsion prove susceptible to improvement by more than one of the various modes of treatment, from which we draw the deduction that the changes brought about in the nature of the pyroxyline, either in its preparation or during the washing of the emulsion, are widely different in character. Thus, we can speak of a sample of washed bromide emulsion which, though to all appearances perfect, it was quite impossible to intensify by any ordinary means. This, when organified by means of various substances applied to the film in the state of solution, produced no variation in the result; but, when allowed to stand for a few days after the addition of a grain or two per ounce of pyro., tannin, or quinine to the emulsion itself, the films gradually acquired the power of taking density, though not to the fullest extent. Gallic acid produced no effect whatever. In other cases almost the reverse has occurred, as by treating the washed film with a suitable organifier the intensification has proceeded without any hitch, while the addition of the same substance to the emulsion has proved ineffective.

Then, again, the employment of a small quantity of collodion in redissolving the pellicle will sometimes give a richly-coloured and finely-divided emulsion, when plain ether and alcohol would merely produce a poor, granular result; but such is not invariably the case, as with some samples of cotton, or when the emulsion has been precipitated, nothing will restore the colour, which appears to have been wholly lost in washing.

One particularly anomalous instance may be mentioned as illustrating the possibility of the formation of some compound only slowly soluble in water, and which, if not thoroughly removed, exercises an injurious effect upon the resulting emulsion. The emulsion was one we had prepared for a friend, employing his own collodion—a sample which had been bromised for two or three years, if we remember rightly. From an error in his estimate of the quantity of silver required to sensitise it, it was poured out to set while still containing a much larger excess of silver than we intended, and with a very small proportion of restraining acid. The result, as we anticipated, proved a complete failure, general fog without a trace of an image following upon development. But we discovered accidentally that by merely rinsing the plate, after coating, until the greasy lines were removed the film developed perfectly clean and with moderate density; the emulsion was washed a second time, but, perhaps, too thoroughly, for it afterwards worked perfectly free from fog, and gave a miserably-thin picture. It may be stated that we made no departure from our ordinary method of working; the same water, the same utensils were employed, and the operation of washing conducted exactly in our accustomed manner. The only feasible view we can, therefore, take of the case is that a silver compound of low solubility was formed *in* the pellicle, which the first washing was incapable of removing. The loss of density after the second washing may, no doubt, be attributed to the inability of the cotton to withstand the double operation.

Another instance may be noticed as bearing upon the peculiar action of certain organifiers when allowed to remain long in contact with the emulsion itself. An emulsion prepared by a modification of the Chardon method, and containing a full dose of quinine, was found after several weeks to have completely lost its sensitiveness. We do not mean that it had become absolutely insensitive, but it required at least ten times the original exposure to produce an impression. Washing the film in plain water produced little or no effect, but by using water slightly acidulated, or by three or four alternate washings with methylated spirit and water, something like its pristine rapidity was restored. In this case we imagine the quinine to have entered into some sort of combination with the emulsion, its injurious action being removed by the washings described.

With regard to the treatment of the plates with an organifier, we have shown that a different effect is obtained accordingly as the organifier is added to the emulsion or applied to the film, and a still wider difference is noticed when the conditions attending the application of the organifying solution are varied. But, after all, the principal cause of this difference of behaviour rests in the emulsion itself, and it is possible, with separate samples of emulsion, prepared by the same formula but with collodion of different character, to secure the most opposite results under the same kind of treatment; and hence it is only fair to suppose that the physical state of the collodion film, rather than the bromide it contains, is chiefly responsible for the altered effects produced under the action of various organifiers.

Mr. Berkeley, indeed, appears to hit the point when he states that a powdery pyroxyline shows no advantage in sensitiveness if exposed moist, though in the case of a "horny" sample such a gain does accrue. We do not assert this to be invariably the case, but we have frequently noticed that certain emulsions show a much higher degree of sensitiveness in the moist or washed state, as compared with the same films when dried, than others which apparently exhibit no difference whatever. Since reading Mr. Berkeley's remarks we have made the experiment, with several emulsions, with this result—that the greater the normal sensitiveness of the emulsion the less difference is there between its rapidity, wet and dry respectively; and that, though a comparatively slow or a defective emulsion may be greatly improved in this respect by treatment with an organifier or accelerator, or even by mere exposure in the moist state, the most highly sensitive and perfect ones show little, if any, gain under similar treatment.

This, no doubt, supplies an explanation of the great discrepancies in the published opinions as to the degree in which a wet emulsion plate exceeds a dry one in rapidity. Mr. Newton states the gain to be from four to six fold when an accelerator is employed, while we have heard one of the greatest emulsion authorities in this country state there is no difference at all except in rapidity of development and density. Possibly each may be correct so far as his own emulsion is concerned.

OBLITERATING OPAQUE DEFECTS IN NEGATIVES.

Under circumstances which need not here be detailed we acceded to a request that we should, on the occasion of a visit recently made to the country, take with us a sample of dry plates of a certain manufacture. In due course these plates were exposed and developed. Subject to one defect, they were quite as sensitive as we were informed they would be found to be. The quality of the negative, also, was excellent; but in the majority of instances the negatives were rendered apparently worthless by the presence of numerous opaque spots with which the surface was plentifully studded. Regarding the cause of these spots we have nothing at present to say; the preparer of the plates has a theory on the subject which, when tested by practice, will eventually be submitted to our readers. It is with these spots in themselves, and as they exist upon the negatives, we concern ourselves at present.

Prints of interesting subjects and scenery besprinkled with white spots, varying in dimensions from mere specks up to those of the heads of large pins, form a sight not calculated to engender pleasant feelings on the part of the photographer conscious that the blame rests not with himself. Several proof prints, mal-adorned in this manner, were eventually made presentable by being carefully worked upon by the pigments of the skilled "spotter." This process was both expensive and unsatisfactory; for the pigment applied to hide such defects is itself a defect from the fatal facility with which the eye rests upon it, and the still greater facility with which it is removed, thus leaving the spot revealed in all its naked deformity.

After various suggestions respecting the reproduction of the negatives through the instrumentality of transparencies, upon which the offending spots would be touched out previous to making use of them for forming printing negatives, the idea occurred to us to dissolve the spots themselves out of the negative, and then to have the transparent holes thus made properly filled by pigment of the same density and colour as the portions immediately surrounding. The great success we achieved in carrying this idea into effect induces the belief that the details of the method employed in doing so will prove useful to many who may be placed in a similar situation.

The first difficulty we had to encounter in the endeavour to bring a solvent to bear upon the spots was found in the fact of the negative having been protected with a coating of strong lac varnish, which it was obvious would have to be removed before the abnormal reduction of silver forming the spot could be operated upon. The removal of a coating of varnish is generally presumed to be a very simple matter. It is only necessary—so runs the popular belief—to immerse the negative in a vessel of alcohol for a short time, when the lac will be found to have been dissolved away. Now, inasmuch as lac which has been previously dissolved, dried, and exposed to light and atmosphere, in the manner of a negative-protecting film, becomes by such treatment more insoluble than it was previously, this necessitates the prolonged employment of very strong alcohol, to which we have known the negative film itself to succumb. It is a process both slow and attended with some danger.

The following is the method we adopted on the occasion to which we refer, and we very strongly recommend it as being at once simple, expeditious, and certain:—Take a bit of caustic potash—there is no necessity whatever for weighing it—a piece the size of a bean, greater or less, answering quite well. To this add about an ounce of water, and when it has dissolved, which will be the case in a couple of minutes, add a quantity of methylated alcohol equal to the water present. Now, holding the negative either by one corner, or, as we prefer, upon a pneumatic holder, pour this solution upon the surface, taking care that every portion is covered. Allow it to remain on for about half a minute, pour off into a porcelain or glass measure, and again apply it to the surface as if it were a developing solution. Pouring off once more, apply to the surface a little plain water with alcohol, and follow this by copious washing with water. When the plate is dried there will not be a vestige of the varnish found on its surface.

We here pause to observe that, if by accident, bad varnish, or inadequate temperature, a negative has been damaged in varnishing, the method just described will prove a most effectual means of denuding the collodion film of its resinous, pellicular coating.

By means of the treatment described the opaque spots upon the plate were rendered in a proper condition for being operated upon by a solvent. Naturally, recourse was had to a solution of cyanide of potassium, and a strong solution was carefully applied by means of a camel's-hair brush. It was of no use whatever; the spots could not thus be induced to disappear. The power of the solvent had to be increased, and some quality had also to be imparted to it by which its action should be confined to the spot upon which it was to be applied. The chemical conditions were amply fulfilled by making use of a somewhat strong solution of iodine in cyanide of potassium, the relative proportions being such as to leave the solvent salt in excess. This is easily effected by adding iodine until the cyanide solution is incapable of dissolving more, and then making a further addition of cyanide. The mechanical conditions are secured by the addition of a few drops of mucilage of gum arabic.

The negative having been placed upon the retouching desk, and a tolerably strong magnifier utilised, a camel's-hair brush, charged with the solution described, is deftly applied to each opaque spot, which, after a few seconds, is seen to become quite transparent. When the whole of the spots have been touched in this manner a gentle stream of water is applied to the film, so as to clear away all the solution of iodine. The spots, previously opaque but now transparent, are next touched in by means of an appropriate pigment to be selected from the colour-box—a mixture of burnt sienna, Prussian blue, and China ink forming a pigment which answers every purpose.

The negatives treated in this manner yield prints which do not demand any artistic operation, and in which it is almost impossible to discover any fault indicating there having been at one time something seriously amiss with the negative.

PAINTED CARBON PICTURES.

The widespread interest with which Mr. J. G. Tunny's communication on the fading of carbon pictures has been received shows the great hold the process has already obtained; and the desire to commence carbon printing will, after the convincing and satisfactory nature of the explanations from the Autotype Company, still increase, we are assured.

There is, however, grave probability of future complications with those who have in their possession valuable paintings with the carbon basis; but it must be remembered that the action that takes place when a silver print which has been worked up in water colours begins to show signs of fading is entirely different from any that might occur in the case of carbon. In the former case there is a continuous and, we may say, strong action occurring between the silver of the image and the pigments that are laid upon it, and beyond this there is also the natural tendency of most silver prints to fade. But in the latter, though there is the faintest possible chance that an action might take place between the slight amount of chromium compounds present and the artist's colours, we think such a possibility may practically be dismissed from our minds; and hence the only danger to be apprehended is that from the cause so recently pointed out. But when we consider that, in most cases, there is an actual stratum of colour—thin it may be, and no doubt is, in the majority of instances—covering the whole image, the comparatively slight alteration of tone may fairly be expected to be free from any evil effect upon the delicacy of the picture, even granting that paper of the now condemned kind had been employed.

Before entering upon the second phase of our observations we would wish here to call attention to the fact that there is a charge to be brought against the painting itself. It is well known that the majority of artists who undertake this class of painting—one of daily increasing importance—are fond of using body colour, with the purpose not only of obtaining their effects but also covering the often too heavy shadows and patches of black in which photographs prepared for the artist too often abound. Now we do not here wish to raise a discussion as to the legitimacy of opaque colour, high authority as there is for its practice apart from photography; what we desire to draw attention to is the fact that there is such a fatal facility about the employment of some of them—effects to be obtained with ease which with other colours require much more time and labour to produce—that sufficient discrimination is not employed in their selection, and, in consequence, those pigments which in themselves are fugitive or discoloured by the action of the air are largely employed.

We give a single instance, and in a future article may return to the consideration of the chemical constitution of some of the more popular pigments of the artist's palette. Naples yellow is of most common employment. Mixed with a little madder it forms, especially for slight and simple (so-called) "tinting," the chief groundwork of the colour of many thousands—we might say tens of thousands—coloured *cartes* annually spread broadcast over the land. We do not hesitate to condemn in the strongest manner the use of this colour in any way for flesh tints. The pictures upon which it is employed are sure to fade, and thus innocent photography will again have to suffer in reputation from the sins of another.

We know that in some establishments coloured pictures—even to five and ten thousand pounds' worth or more in a year—are produced; and to those conscientious principals who have employed a carbon basis as a sure safeguard against fading much consternation may have been lately caused. There is, however, a most excellent method in high-class work of obtaining the highest excellence in painting, while retaining the verisimilitude of photography; and we shall now give details of the method employed in practising it as communicated to us by a professional photographer who has employed it for some time.

When the subject or negative is determined upon, and the style—say, for instance, a half-length vignette—chosen, the first step after the enlargement is obtained is to get a carbon print, as a guide, from the negative, and then to stop out the whole of the negative but the face and neck down (say) to the collar. The negative should be reversed, of course. The guide print will enable the necessary size of paper to be chosen, and also the relative position on the figure upon it. There is then marked in pencil a square which will contain (and leave a little room to spare) that part of the negative which is left to print from; and in this space the paper must be covered with the usual chrome alum and gelatine preparation and allowed to dry, when it is ready to receive the picture. A carbon print on a small piece of tissue is then obtained of the head, &c., and squeegeed on to the marked-out spot, and in due course developed. If everything has been successfully performed there will be a head photographed on to the middle of a blank piece of paper, leaving pure unprepared paper for the artist to trace from his guide, the body and limbs, &c., and to give him that freedom of handling which can only be obtained with such an accustomed surface as ordinary drawing-paper. The picture, when finished, is practically a water-colour drawing, with the aid of photography to preserve the likeness of the features.

We advise those of our readers who supply their clients with the most expensive class of work to give this method a fair trial; they cannot but like it and its accompanying freedom from doubt of any kind. If even to avoid the dreadful expedient of cutting out a photographic head and, after paring it down, mounting it on a plain paper, the process is to be praised and recommended.

We frequently have occasion to find fault with our American friends for the extremely loose manner in which they sometimes state their chemical formulæ or describe various chemical manipulations. We have now to complain of the verbal instructions in manufacture of the ferrous oxalate developer, given by Mr. H. J. Newton at the last meeting of the Photographic Section of the American Institute, and reported at page 381 of our last number. It is due to Mr. Newton to remark that his directions were given in a familiar and conversational way, under which circumstances there is a strong tendency at all times to depart from the strict accuracy of chemical phraseology; but, on the other hand, it is the duty of every speaker at a *public* meeting to make himself as clear and explicit as possible, and not to inflict upon his hearers or his *readers* a series of disjointed statements which savour considerably of the cross-examination of a witness in a law court. Mr. Newton, too, should be specially particular, as from the great things he promises for his emulsion he is likely to have a numerous following; but if he gives his information in the careless, offhand way we speak of, though it may be sufficiently plain to those who happen to be well up in the subject we fear that there is a large class who will be only misled thereby. We must ourselves confess to a considerable amount of uncertainty as to Mr. Newton's meaning in the paragraph to which we refer. "Ferrous neutral oxalate of potash" is a rather peculiar term, but one which we fancied we understood until we found it was made by mixing two solutions of potash and oxalic acid, or by placing crystals of oxalic acid in a solution of potash. But, perhaps, to use Mr. Newton's own words, "it is not quite clear in the minutes." The more serious point we wish to come to, however, is the method which Mr. Newton recommends of simply adding solution of ferrous sulphate to the mixed solutions of potash oxalate. The result may be, no doubt, a workable developer; for, as Mr. M. Carey Lea has shown, the developing action is easily set up, the mere addition of oxalic acid to the ordinary iron developer being sufficient. But we strongly question the advisability of this mode of preparation. Nothing can be clearer or more explicit than Mr. Willis's directions—a saturated solution of neutral oxalate of potash; even if it be not employed of that strength it forms a trustworthy starting-point. But the plan proposed by Mr. Newton not only gives rise to some uncertainty with regard to the strength of the solution, but gives a product which, even when newly prepared, contains foreign matter. Our own experience of this and similar modes of preparing ferrous oxalate is that, setting entirely on one side the question of efficiency, the keeping qualities of the solution are much impaired by the presence of any traces of decomposition products, such as are likely to be formed in the course of treatment proposed by Mr. Newton. We cannot, therefore, see the advisability of departing from the older and likewise *simpler* plan.

A NEW METHOD OF MAKING GLASS STEREOSCOPIC TRANSPARENCIES.

I have heard many express regret that the stereoscope is almost a thing of the past. Booksellers and dealers in photographs say at the present day that stereoscopic pictures are very seldom asked for by their customers; now and then, occasionally, they may have an inquiry for some. I attribute this to the market being overstocked with such miserable, wretched trash as we have seen exposed in the shop windows for sale, and I think the paper print in the stereo.

form will never have the sale that it has had. By all true lovers of the picturesque I am sure the glass stereoscopic transparency is always admired. As for myself, I am never tired of looking at them when they are properly made.

Hitherto the trade has been in the hands of a few, among whom I may mention the names of Soulier and Co., of Paris, and Breese, of England. I have seen many of their subjects that I have considered perfection itself; but there has been one great drawback, and a very serious one, and that is the high price charged for them. I know that some of the processes adopted by those gentlemen were very elaborate, requiring very skilled operators, and hence the expense; but now that photographic processes of the present day are very different from those of days gone by, I am perfectly sure that, if a few were to take to preparing and issuing at a moderate price good stereoscopic transparent slides by the process now to be detailed, it would add considerably to the income of the producer, for many thousands of stereoscopic negatives are at the present day idle and buried in the plate-boxes of both amateur and professional photographers.

There is another obstacle which has hitherto been in the way of the photographer in producing them, and that is that when the negative has been taken with a binocular camera, the two separate halves having to be transposed, the best way has been to cut the negative in half in the first instance; and I have scarcely ever found a photographer who did not object to such a system. Then, again: to make two exposures on the two different halves of the plate was attended by a great loss of time in making the proper arrangements, which added greatly to the cost of production; so a high retail price having to be charged on the one hand, and the cost of production by the photographer on the other, have prevented more being made than have been. I am sure that something in the way of business may be done in this direction if only pushed.

Of late several photographers have been writing and asking me if I could propose a system whereby transparencies might be produced easily and at not too great a cost; so for some time past I have been at work making experiments in that direction, which have been very successful, and I now offer the details of the results obtained for the careful consideration of those who may be interested in the matter.

First, as respects the negative: almost any class of negative will do, but, generally, those which are considered to give good paper prints I find secure the best results. Negatives which are somewhat too intense can be used, and yield, with care in developing, first-class results, while the defect of hardness is modified. On the other hand, a negative that is fogged and gives a flat result on paper can also with care be made to yield excellent results. So it will be readily seen that almost any class of negative can be used, and many, perhaps, which are useless for ordinary work.

I must not forget to mention that the negative must be well varnished with a tough varnish, especially if the system of printing by contact is adopted. Any slight defects must be very carefully spotted out in the negative, and not, as I have seen some photographers stop out a negative, as they call it, with a great blotch of black; for every print on paper printed from such a negative has to be spotted out, which entails endless work if large numbers are required. In transparencies, for whatever purpose they may be required, any defects or spots look very bad on glass and are difficult to touch out; so it is always better to spend a little time over the original negative in order to gain the best results.

Preparation of the Glass Plate.—The glass plate must be perfectly clean and free from scratches; bubbles in the glass on which the transparency is made is not of the slightest importance, as they will not show in the finished production. No substratum of any kind whatever must be used. The method I adopt in cleaning all my glass plates used in photography is very simple, and I never have a dirty plate. If the glass be new I place the plates in a gutta-percha dish or tray of—

Sulphuric acid	1 ounce (fluid).
Water	1 pint.

I allow them to soak for about an hour or more (this acidulated solution can be used over and over again). Any other acid can be used, such as nitric or hydrochloric—whichever is readiest at hand. I then take them out one by one and wash them under the tap, rubbing them with a bit of common hard sponge and using plenty of water. I then set them to drain and afterwards polish them with a leather, using methylated spirit. If old glass be used I remove the films in boiling soda and water previous to applying the acid solution; dry and polish as before, using methylated spirit. In all photographic processes too much care cannot be taken to ensure a chemically-clean plate.

To get the best results, both as regards tone and quality of the picture, I always use the collodion emulsion process; at the same time, however, those who prefer it can use wet collodion with the nitrate of silver bath, but it gives very inferior results when compared with collodio-emulsion. After the plate is clean a slight edging of india-rubber dissolved in benzole is run round the edge of the plate to about one-eighth of an inch. I use a stumpy, common camel's-hair pencil tied on to a narrow strip of glass, the glass projecting about a quarter of an inch below the pencil. The solution I use consists of—

India-rubber	3 to 6 grains,
Benzole	1 ounce.

When dry (which will only take about one minute) the plate is placed on a pneumatic holder, and any dust which may be on the surface removed by passing over it a broad, stiff, hog's-hair brush; it is then carefully coated with emulsion, and set to dry in a cupboard free from dust.

The Exposure.—This can be accomplished in two ways: either by contact in a printing-frame or in the copying camera; but I prefer the former system, as giving better results than the latter. I must not omit to mention that all my stereo. negatives are taken on $7\frac{1}{2} \times 4\frac{1}{2}$ plates, and from negatives of that size I use plates $7\frac{1}{2} \times 3\frac{1}{2}$ on which to make the transparency, thus allowing plenty of room for working. But, whatever be the size in length of the original plate, the plate for a transparency must be the same, and the $3\frac{1}{2}$ in. depth of the plate must always be adhered to. I always use a printing-frame with a thick plate-glass bed-plate somewhat larger than the size of the negative used, and into that I cut a piece of six-sheet cardboard, which fits well the full opening of the frame. I then lay the negative on the middle of the cardboard and mark round it, cutting the centre out with a mount-cutting knife, so that the negative will fit tightly into it. This both prevents blurring at the edges of the plate and keeps the negative from shifting and getting damaged. When the negative is in position it is carefully dusted, and the prepared plate placed in contact with it. In putting in the backboard of the frame always be careful to keep the side where the hinges of the bars are kept close up (pressed tight); for by such means, when the bars are brought over into position, there will be no dragging motion in that direction to injure either of the films. It is the sliding or grating movement that is liable to injure the film. It is then exposed to the light in the usual way. Avoid sunlight. If the exposure be made at a window facing the north the light is, as a rule, very regular all day. The length of the exposure, of course, depends upon the rapidity of the emulsion used; also on the density of the negative and the brightness, or, I should say, the intensity, of the light, the time of year, and method of development employed. Taking all the foregoing conditions into consideration, the time will vary from about one second to half-a-minute or more. After the exposure has been made the same precaution must be taken in removing the backboard. The fingers of the left hand must be pressed tightly on the backboard with a downward pressure, the bars unfastened, the backboard removed without any sliding movement, and the exposed plate carefully removed. All this can be accomplished with very little practice.

With respect to making the exposure in the camera: it has one great advantage in its favour in some instances, which is this—if the image on the original negative be too large it can be reduced by the camera, which is of great importance. The original negative is placed in the frame of the camera to receive it, film side of the negative to the lens, focussed, and exposed in the ordinary way.

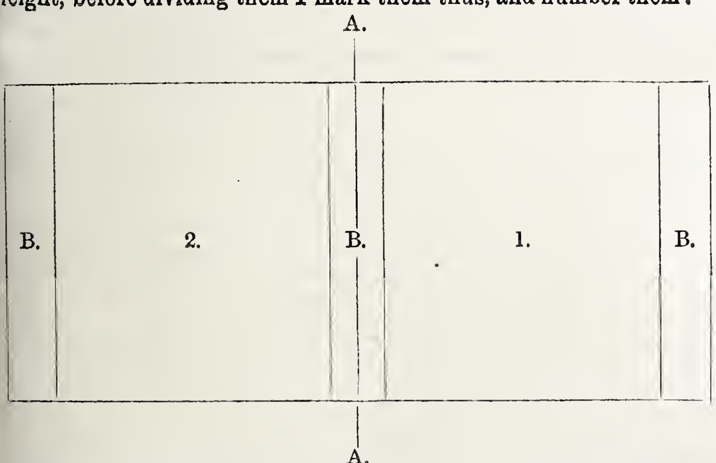
The next point is the development of the transparency. After it has been exposed by either method, the system of developing is conducted in the ordinary way or to the fancy of the operator, according to the process with which he is working. A few words will not be out of place respecting the class of image required. The parts representing the high lights of the picture must be bare glass. The fine lines of the deepest shades *only* must be intense, and all the true gradations in the negative must be preserved, and not buried, which is very often the case, and by which the whole effect is marred; for in a good transparency, properly developed, there is a greater amount of detail visible than in a paper print, and that is why a print on albumenised paper is at times so unsatisfactory. A transparency well made is the most perfect transcript of nature that photography is capable of rendering. After the plate is sufficiently developed it is fixed (or cleared) in the usual way, with either hyposulphite of soda or cyanide of potassium, according to circumstances, and great care must be taken to well wash the film free from all the soluble salt of the fixing agent used. I prefer to soak plates by leaving them in a tray of clean water for half-an-hour or an hour and then well wash, because if any trace of the fixing agent be left in the film it is liable to eat away part of the fine detail and spoil its beauty.

The next operation is to prepare for transferring the film. Take a sheet of fine grained paper, either Saxe or Rives, and float for about one minute, or until it lies flat, on a solution of—

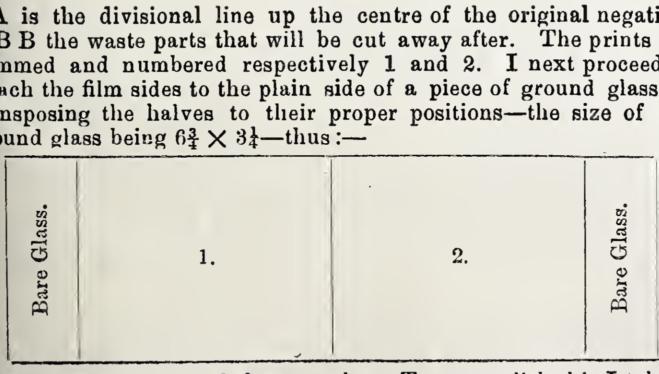
Gelatine	60 to 80 grains.
Glycerine	2 or 3 drops.
Water	1 ounce.

It is then hung up to dry. I have prepared this paper myself, but am very thankful to say that I have got rid of this part of the manipulation, as I find that I can purchase it ready prepared in the market, which I consider a great boon. I do not think that I shall, in this instance, be overstepping proper bounds by stating that Mr. J. Solomon, of Red Lion-square, London, keeps it in stock. I have not heard that anyone else prepares it, as at present it is very little used. If I have committed myself I claim the indulgence of the Editors.

The transparency must be allowed to dry *spontaneously*. A piece of the gelatine paper is cut just the size of the glass carrying the transparency and immersed in a dish or tray of clean water for about one minute; the transparency is then well wetted under a tap and laid on a flat board (film side up, of course). The gelatine paper is then lifted out of the water, being allowed to "bag" in the middle, and is brought in contact with the wet film of the transparency, the two ends being gently lowered; a very soft squeegee is then passed over it, lightly at first, in all directions, increasing the pressure as the water is pressed out, taking care to remove all overlapping paper at the edges, or it will curl up in drying. The plate is now set up to dry spontaneously; on no account must the drying be hastened by heat. When perfectly dry cut with a sharp knife just within the india-rubber edging, and lift one corner, when generally it will be found to leave the glass without any trouble; but should there be any tendency to stick place it in a dish of *cold* water for a few minutes, and it will then readily strip off. It is now allowed to dry gradually. When perfectly dry lay the film side down upon a glass plate to trim, and take a piece of glass three and one-eighth inches wide and about eight inches long. The three and one-eighth will be the height of the picture, which must be trimmed to this size. Now take another piece of glass two and seven-eighth inches wide; this will be the width of each half. After I have cut the prints to the height, before dividing them I mark them thus, and number them:—



A A is the divisional line up the centre of the original negative, B B B the waste parts that will be cut away after. The prints are trimmed and numbered respectively 1 and 2. I next proceed to attach the film sides to the plain side of a piece of ground glass by transposing the halves to their proper positions—the size of the ground glass being $6\frac{3}{4} \times 3\frac{1}{4}$—thus:—



The halves are mounted close together. To accomplish this I take—

Gelatine	45 to 50 grains.
Water	1 ounce.

I allow the gelatine to soak in the water for about half-an-hour, and then dissolve by heat and strain through a piece of muslin. To each ounce of this solution I add about four to six drops of a saturated solution of chrome alum. It must be kept hot by the vessel containing the gelatine being placed in an outer vessel containing hot water; for if once this sets no amount of heat will effect its solution again. But care must be taken not to add too much chrome alum, or it will set at once. The cleaned plain side of the plate is now coated with this, being guided over with a glass rod, and the surplus returned as in the case of collodion. Allow it to chill a little, but not get cold. To this point special attention must be paid, or failure will be the result. Each half is now put down in its proper place, as shown above; a sheet of clean blotting-paper is laid over each and gently rubbed down with the fingers, working from the centres of each half and pressing out all air-bells, if any, which can be readily seen through the ground side. The plate is then laid aside to dry, or it can be reared up on end in a rack. The drying will take about one hour at this time of the year, but longer in winter. No heat must be used on any account. When dry the plate is put into *hot* water, which soaks through the paper in about one minute and dissolves the gelatine with which the paper was coated, and which can now be easily stripped off. By virtue of the chrome alum added to the gelatine that layer or coating becomes insoluble and holds the collodion film fast to the plate. Gently wash the plate with the hot water, and rear it up on end to dry; by this means we shall obtain the stereoscopic transparency without cutting the original negative, and in its most perfect condition.

Before I conclude I must give a caution. In case a difficulty arise in removing the paper from the film, it is generally caused by bringing the film of the collodion into contact with chromatised gelatine while it is in a too liquid state, causing the fluid to find its way through the collodion film, and rendering the gelatine with which the paper was coated insoluble. If this occur it is impossible to remove the paper, as the whole of it is made fast. To guard against any difficulty that may be thus experienced proceed as follows:—Before the paper is attached to the collodion film the latter may be coated with india-rubber dissolved in benzole and allowed to dry, and then coated with Mawson's enamel collodion, and, when dry, the gelatined paper attached as before described. This stops the soaking through of the gelatine and chrome alum, and prevents the mischief; but with ordinary care this can be dispensed with.

I have now entered into this matter with the necessary detail, but should I not have made myself quite understood I shall be most happy to answer any queries through the medium of these columns. I do not in any way claim any originality as respects the use of the gelatine in this way. I am aware that it has been used for several purposes, and I have here pressed it into service in order to accomplish the end I had in view. Wm. Brooks.

THE APPLICATION OF PHOTOGRAPHY TO THE PRODUCTION OF PRINTING SURFACES AND PICTURES IN PIGMENT.

IN SIX LECTURES.

IV.—PRINTING OF HALF-TONE SUBJECTS FROM METAL.—APPLICATION OF ASSER'S PROCESS.—TALBOT'S PHOTO-ENGRAVING.—WOODBURY'S METHODS OF ENGRAVING AND PRINTING.

[A communication to the Society of Arts.]

When treating of photozincography I gave details of Asser's process, and I showed you a zinc plate bearing the fatty image. Since then I have etched that zinc plate, so as to convert it into a high printing block suitable for the typographic press. Here it is. Here is an electrotype cast of it; and yonder is a proof from it, hanging side by side with a proof from the unetched plate. In comparing these proofs you will see that a little of the detail has been lost during the etching; but this is not due to any defect in the process, but to the fact that I etched the plate too rapidly. In etching a plate of this kind the re-inkings must be done with great caution, and the acid used for the earlier etchings must be very dilute—say one part of acid to one hundred of water.

I hope to see Asser's process come into use for large and comparatively rough work, it being well adapted for this. Mr. Dallas has brought the manufacture of typographic blocks, for the representation of half-tone, to great perfection, and he has kindly lent me some of these, and also prints from them. Although we do not know what method Mr. Dallas employs in making his "tint" blocks, we can all appreciate the excellence of the results.

The illustrious Talbot discovered a method of printing in half-tone by means of etched copper or steel plates, and very beautiful results have been obtained by his method, which I now intend to illustrate to you.

Here is a copper plate which has been carefully cleaned and charcoaled. I slightly warm this and fix it on the turn-table. I next pour on it a warm solution containing six parts of gelatine, one hundred parts of water, and one part of ammonium bichromate. The table being now rotated all excess of the gelatine solution is thrown off, and a thin, even film is left on the copper plate. The plate must next be dried at a gentle heat, after which it is ready for exposure to light under a transparency. Here is a plate which has been so exposed, and you will notice that, where the light has acted, the coating has become brown, and at the same time it has become insoluble in aqueous liquids, the degree of insolubility depending on the extent to which the light has acted. The next problem is to etch through the soluble parts of this film without destroying its continuity. This cannot be done by nitric acid, as the acid destroys the gelatine film at once; but a strong solution of iron perchloride will answer the purpose. The plate being now put into this solution of perchloride of iron the etching has commenced. Those parts of the gelatine film which have not been acted on at all by the light remain very soluble and allow the etching to take place rapidly, while those parts where much light has acted resist the solution altogether, and those parts which have been acted on by a small proportion of light allow a proportionate amount of the iron perchloride to penetrate. Thus all degrees of light and shade are represented by corresponding amounts of etching. The plate is now sufficiently etched. I take it out, clean off the gelatine, and now it is ready for the press. Here is a proof from a similar plate.

The next process to which I direct your attention is one discovered, perfected, and carried out on a large scale by Mr. Woodbury. The Woodburytype process consists in casting coloured gelatine pictures in a metal mould. Here is a metal mould—the method of making it I will describe directly—in which the image is hollowed out, the depth of the hollow being greatest in those parts corresponding with the dark parts of the picture, and everywhere deep in proportion to the intensity of the shade. I place this mould in a dish containing blackened water, so that the water just runs over its face. You now see no picture or anything approaching to a picture. Now notice the effect of pressing a piece of plate glass down on the surface of the mould. The excess of blackened water is forced out, and the hollows of the mould alone are filled up with the blackened water. Now, as these hollows vary in depth, varying degrees of shade are produced, and a perfect picture is produced. I take the glass off, and the picture disappears; put it on once more, and it re-appears. Instead of coloured water I pour on this mould a little coloured gelatine, and press a piece of plate glass down on the surface. The excess is forced out, and the mould filled with coloured gelatine. In a few seconds the gelatine will have set, and I shall be able to lift off the glass, which will carry with it the gelatine image. Here it is; it forms a transparency suitable for the magic lantern. If, after having flooded the mould with coloured gelatine, a piece of paper is laid on and the excess of gelatine is forced out with a plate of glass, a picture composed of coloured gelatine is moulded on the paper, and can be removed as soon as the mould is set. When removed it is dipped into a solution of alum, in order to render the gelatine image insoluble in water.

So much for the general principles of Woodburytype; and now let me show you how you can work this process yourselves.

The first thing is to dissolve about six parts of easily-soluble gelatine and two parts of lump sugar in fifteen parts of warm water. Here is the warm mixture already strained through muslin, and here is a waxed glass plate, set level and bordered with a little ledge of wood. The warm gelatine solution being poured on spreads itself over the plate, forming an even layer, which, in the course of some hours, will dry, forming a uniform sheet. Well, here is a dry sheet of the gelatine on another piece of glass, and you see that the introduction of a penknife under one corner of the gelatinous sheet brings it off the glass at once. The next thing is to make this gelatine sensitive to light, and for this purpose it is soaked in a solution of potassium bichromate containing three and a-half per cent. of the salt. You see that it has now become quite flaccid by absorbing the solution, and I now lay it on a sheet of glass and remove the excess of solution by means of the squeegee. The bichromated gelatine adheres to the glass, but when dry it will be easily removable.

Here is a glass plate with a dry sensitive film on it. I take the film off and place it under a negative. It is now ready for exposure to light, and would require about two hours of such light as we had today at noon. Here is a printing-frame containing three such films, which have had the necessary exposure under their negatives. I put these films in water and let them get moderately soft, but not so soft as the film became during the sensitising. One of these I take out and lay face downwards on a piece of finely-ground glass; another is similarly placed on a piece of glass covered with gold-beaters' skin, and the remaining one is put down on a sheet of collodionised glass. The squeegee is now applied to each, and adhesion takes place. In order to enable the gelatine films to firmly fix themselves to the supports they should remain at rest during a period of about half an hour; but, as we cannot wait that time, I have provided a duplicate set previously prepared. Mr. Barker will now put these into warm water, and the gelatine soon begins to dissolve. Now, remember that certain parts of the bichromated gelatine have been made insoluble by the action of light shining through the negative, and these insoluble parts will remain undissolved on the supports (ground glass, gold-beaters' skin, and collodionised glass). It will take some little time for Mr. Barker to wash away all the soluble gelatine; but towards the end of the lecture you will see his results in the shape of gelatinous reliefs—thick where corresponding to the blacks of the picture, very thin in those parts representing the whites, and finely graduating between these extremes. When the reliefs have been sufficiently developed they must be dried; and here is a finished and dry set. You see that, having only one hour, it is necessary to get continually in advance of the work, and to take fresh materials which have been previously worked up to a certain stage. Let me begin with the relief on finely-ground glass. This, being gently warmed, I put a border of wood round it and pour on some fusible metal, made by melting together one part of cadmium, two parts of tin, four parts of lead, and seven parts of bismuth. Well, now, if I left this to cool in the ordinary way the top would solidify first, and the lower layers of metal in contracting would leave small vacant spaces next to the surface of the gelatine, thus rendering the cast imperfect. To obviate this I place the glass on this cold block of metal, and cover the top of the fluid fusible alloy with warm sand. The rest explains itself; the portion of fusible alloy next the face of the mould becomes solid first. Here is a fusible metal mould made in the way I have just illustrated to you; I oil it slightly, pour some coloured gelatine solution on it, and force away the excess by means of flat glass, and when the gelatine has set the glass can be removed, carrying with it the moulded transparency.

Here is the relief on gold-beaters' skin, and here is the one which was developed on collodion. These can easily be stripped from their glass supports, as I now show you. One corner being liberated, off they come; I will pass them round for you to look at. Now, in the actual commercial practice of Woodburytype printing, a film relief, such as you are now passing round, is forced into a plate of lead by means of the hydraulic press, and the leaden mould thus obtained is used for printing. I now lay a film relief on the smooth steel base of this screw press, place a piece of lead on the top, and apply pressure. You see the result—the lead has become an exact counterpart of the gelatine relief, which you will notice is in no way damaged.

Here is a leaden mould, together with the corresponding relief, kindly supplied by MM. Braun and Co., of Dornach, and here is a very fine mould made by Mr. Woodbury himself. I will make a cast in this, and you see that the result is one of Mr. Woodbury's magnificent lantern slides which are now so popular. It is now projected on the screen, and you can all see it. I take it out, or the heat would melt the wet gelatine, and I pass it round for you to examine; but remember that it is not yet dry, so do not touch the face of it.

I think I explained to you that, in order to get a Woodburytype picture on paper, it is merely necessary to interpose paper between the gelatine, as poured on the mould, and the plate-glass cover, which forces out the excess. To illustrate the matter, I will print one from this mould. Now, notice the paper I use. It is thin, hard paper, surfaced with shellac, to prevent the gelatine from penetrating it, and heavily rolled, to make it even in thickness. There is much more which I would like to tell you about the Woodburytype process, but I have not time. You will not fail to notice the admirable collection of prints and illustrative specimens kindly lent me by the Woodburytype Company, MM. Goupil and Co., Braun and Co., Bruckmann, and others, who are working the process on a large scale, not forgetting these very fine specimens lent by Mr. Woodbury himself.

I may mention that, in actual practice, one Woodburytype printer can attend to several moulds, and by the time he has filled the last of the series the first is ready to give up its picture. The moulds are arranged on a circular table, which revolves in front of the operator.

Mr. Woodbury has modified his process so as to obtain copper plates suitable for deep printing in the ordinary copperplate press, and this modification has been worked with the greatest success by MM. Goupil and Co., of Paris, who have kindly lent me these magnificent specimens of their work.

A gritty powder is added to the gelatinous mixture employed for making the relief, and, when the relief is made, it is found to be more or less rough, from the projection of the gritty particles. The relief is then rolled against a sheet of lead so as to make a perfect reverse in this metal. As far as form is concerned this plate of lead is perfectly adapted for printing in the copperplate press, the hollows left by the projecting particles of grit holding the ink to perfection. But as lead is much too soft to be used as a deep-printing plate, the leaden plate is reproduced in copper by the electrotype process, two electrotypings being, of course, necessary—one to make a reverse mould, and a second to make a cast of this mould, or a duplicate of the original leaden plate. THOMAS BOLAS, F.C.S.

NOTES FROM AMERICA.

THE PREPARATION OF SENSITIVE PLATES IN DAYLIGHT.—KLARY'S WET COLLODION FORMULÆ.—HINTS ON PHOTOGRAPHING CHILDREN.—LAMBERT'S LIGHTNING PROCESS.

Our energetic friend, the editor of the *St. Louis Practical Photographer*, expresses something akin to ecstatic delight at the bare idea of the preparation of a sensitive plate in daylight. After alluding with pardonable pride to the achievements in practical science by Americans, and especially in photography, he says:—

While thus glorying in what we have done we must admit that our friends in Europe are doing something also. While we are puzzling our brains over lighting and carbon processes—both very good, of course, and well worthy of our closest study—our friend, Herr Obernetter, of Munich, has turned his study in another channel, and succeeded in evolving a process by which plates may be prepared in open light, no dark room being necessary. This is a very important discovery. We have before us a number of specimens of carbon photography by the lichtdruck process, also invented by Herr Obernetter, in which the negatives were made in his garden without a dark room, the plate being collodionised and excited or sensitised in open daylight. They are fine specimens—clear in light and shadow and full of detail, not the most feeble indication of fogging, and the modelling perfect. Usually outdoor portraits are lacking in rotundity; the gradation from high light to deep shadow, so pleasing in portraiture, is wanting, and we have the light and shade in masses. In these specimens there is no lack of half-tone, no mass of deep, impenetrable darkness nor glaring high light, but a fine, harmonious picture, as nicely balanced as if made in a first-class studio, with all the conveniences for modifying the light to suit the whims of the sitter or the taste of the artist.

Onward and upward—higher, still higher, is the flight of our noble art. What may we not hope for now? The daguerreotype came and went, leaving as its successor the ambrotype, which, in its turn, gave way to the photograph. Slow old processes like the albumen negative process died a natural death, and now we can produce outdoor work so rapidly that the rain-drop is caught falling, the swallow poised in mid-air, the locomotive as it thunders past; yea, even the shell on its murderous way, hissing and screaming through the air, carrying confusion, or may be death, from the cannon's mouth to the ranks of the foe. Heretofore a costly or cumbrous machine, to exclude white light from the plate from the time it was collodionised until it was developed, has been a prime necessity, and scores of inventions have been introduced having this end in view. This grand forward movement of Herr Obernetter, rendering these troublesome accompaniments to a photographic tour or excursion totally unnecessary, is important beyond conception, and we can hardly contain ourselves until the details of the process are made public. We do not know if the inventor intends publishing it for the benefit of the fraternity at large—a thing we doubt very much. Our readers can rest assured we shall spare no pains on our part to lay it before them at the earliest possible moment in any shape it may be brought forward.

Apropos of this, it may not be generally known that so long ago as the spring of 1865 a gentleman and (we know that our brother of the *Practical Photographer* will appreciate this) *an American* had made the discovery that sensitive plates could be prepared in daylight. Professor Charles F. Himes, the gentleman referred to, in an article contributed to THE BRITISH JOURNAL OF PHOTOGRAPHY of April 28, 1865, explained the principles upon which he based his process. The process, which we here only give in rough outline, consists in collodionising and sensitising the plates at spare moments during the day and in *daylight*, followed by transferring them to a desensitising bath of iodide of potassium, and in the evening treating them with a solution of tannin, by which their sensitiveness is restored. We cannot resist the temptation of giving a brief extract from the article in question by Professor Himes:—"The fears sometimes expressed in regard to exposure to light during the preparation of plates which are afterwards treated with a desensitised agent seem to be entirely groundless; and plates prepared up to the point of sensitising with tannin might be found convenient in travelling, as they free photography from the drudgery of plate-cleaning, and, at the same time, leave nothing to fear from custom-house officers or accidental exposure to light." We feel assured that our reproduction of this paragraph will set some of our more recent readers "athinking."

From the same journal *(Practical Photographer)* we extract what has been designated "Klary's formulæ." Whether they are or are not the formulæ by which M. Klary is at present working in Paris we know not. We give them for what they are worth:—

COLLODION.

Ether	16½ ounces.
Alcohol	16½ ,,
Cotton	150 grains.
Cadmium iodide	80 ,,
Ammonium iodide	80 ,,
Potassium bromide	50 ,,
Cadmium bromide	50 ,,

NEGATIVE BATH.

Distilled water	3½ ounces.
Silver	123 grains.

DEVELOPER.

Water	35 ounces.
Iron	2 ,,
Acetic acid	2½ ,,

INTENSIFIER.

Water	7 ounces.
Iron	185 grains.
Citric acid	30 ,,

In use, a few drops of a three-per-cent. solution of silver is added to the usual quantity of this solution.

PRINTING BATH.

Water	3½ ounces.
Silver	185 grains.

TONING BATH.

Chloride of gold	15 grains.
Water	18 ounces.

In use, to two and a-quarter ounces of this solution are added six or eight drops of a saturated solution of sodium carbonate, twenty-six ounces of water, and 308 grains of common salt.

A little handbook published by Messrs. North and Oswald, of Toledo, Ohio, for the guidance of their clients, contains the following excellent remarks on the subject of photographing children:—

We are always glad to take a reasonable amount of pains with children; they are subjects that make lovely pictures, and every parent should see to it that they are photographed regularly once a year at least. If you could see the tears and sorrows that we do on account of the *neglect* of having this done when it is too late, and the lovely child is dead, and parents have often *nothing* in the way of a picture, or at best a poor tintype, taken by some Cheap Jack, and paid for by the servant girl, which is good for nothing to copy or to make an enlarged picture from, you would not put off nor neglect to have, at least, a good card photograph of each of the family, old and young. Let us make a negative for card photographs of your little babies and older children; we keep it here in a good state of preservation, then in case of sudden death we can give you a splendid, lifelike, desirable picture of them, which is a joy for ever. They are difficult to secure, it is true, but we always get something of them; and if it be not satisfactory the first or second time it is not apt to be so at all *that* day, and it is best to bring them again. Never threaten a child if it will not sit, and never coax it with sweatmeats; permit the operator to manage it from the beginning. Dress the little one with care and good taste; avoid startling plaids and gaudy colours, or a variety of colours. Dark dresses should not be put on them. Let the photographer choose the position. A sitting or kneeling attitude, or vignette head, is generally best; for few little ones *stand* still long enough to have a picture taken, though we make cards and cabinets, in our new styles of *rustic* or *seaside* photographs of children full length, and in groups, if not *too young*, that are pretty and natural and very much admired. Mr. North is very successful with children; he likes them, and they in turn like him—or, rather, they take to him, and he always succeeds in *taking* them well. Experience in the photographing of children, from three weeks up to three years of age, teaches us that it is better to have the child come with the *one* person the child likes best and who has the most control over it. Too many gives the child the idea that it is a terrible thing to have a picture taken, and in very young children we notice that we secure a better result with no one but the *one* person in the room besides the operator, as they do not have so many to look at, and are more apt to keep their eyes still, and make a more natural picture.

We have on more than one occasion spoken of "Lambert's lightning process," which is being industriously pushed in America. Concerning the preparation of the collodion, bath, and developer we do not possess reliable information; but the following instructions respecting the method of using the preparations—which are only sold in America ready for use—will not be without interest. We are indebted for them to the *Philadelphia Photographer*:—

Collodion.—The lightning negative collodion will keep indefinitely, and is sent ready for use. Carefully coat the albumenised plate, allowing the film to become well set before immersion in the bath. Keep the plate in motion in the bath, and remove it as soon as the greasy lines have disappeared. The dark room must be *absolutely* free from all actinic light. To have the maximum of rapidity the plate must be exposed as soon after removal from the bath as possible. Filter, and thin the collodion as usual, if necessary.

Bath.—Usually the first bath sent is of proper strength, and ready for immediate use; afterwards it will be sent in concentrated solution. Test it, and dilute it with distilled water or ice water, so as to make forty grains to the ounce, keeping a little of the concentrated solution to strengthen the bath, when necessary, to keep it at forty grains to the ounce. After the bath has been in use for some time it will naturally deteriorate, from the absorption of alcohol and ether and an excess of iodides. It should then be rendered alkaline with liquid ammonia or weak cyanide of potassium, adding distilled water equal to one-half the quantity of the solution, and evaporate in the usual way to its original quantity; then expose to the sun until all precipitation ceases, and when cold filter twice through clean filters. See that the bath is in strength forty grains to the ounce, or make it so by adding either distilled water or some of the reserved concentrated silver solution; also add sufficient C. P. nitric acid to show the slightest trace of acidity on blue litmus paper after one minute's immersion, for the bath works best when as nearly neutral as possible.

Should the plate be *fogged* try to remove it by rubbing lightly with the fingers; if it come off it is a proof that the bath is too acid, so treat it with liquid ammonia or weak cyanide of potassium. If the fog be in the body, and cannot be rubbed off, it is evident that the bath is too alkaline; then treat it with a little C. P. nitric acid.

Developer.—This developer will keep indefinitely, and must be mixed with its own bulk of distilled water before using. The development must be continued as *long as possible, being unusually slow*; it will take up again any precipitation without injury to the negative. Use just enough developer to cover your plate. Some photographers catch their developer in a tray, and after filtering it use it over again without any bad results. Should the subject have required an unusually short exposure allow the plate to remain in the holder a few minutes after exposure before development. If the picture flash out suddenly in the development throw off the excess of the developer, and rock the plate quickly until the proper density be obtained. Should the picture develope with too much hardness reduce the strength of the developer.

Fixing.—Fix in hyposulphite of soda, as usual; but if the negative look too hard a dash of cyanide of potassium will soften it, but it must be used carefully, and not too long.

Continuator.—The continuator is rarely needed, but, if so, add to it an equal quantity of water and a few drops of a ten-per-cent. nitrate of silver solution at the moment of using. It is only used after development to bring out the details of an under-exposed negative when the developer fails to do so.

Reintensifier.—Very seldom necessary, being only used to obtain greater intensity, when it takes the place of the continuator. Dilute it with five times the quantity of water, and add, at the time of using, a few drops of a weak silver solution. It should be used carefully, as it gives a very strong colour.

N.B.—Be careful to have the glass perfectly clean, as foreign organic matter causes fog and stops detail in development.

FOREIGN NOTES AND NEWS.

Herr Birfelder on Collodion.—Dr. Richard on the Gradation of Light and Shade in Portraiture.—Herr Stefanowski on Reticulation of the Carbon Film.—Professor Böttger on a Good Iron Salt for Copper Plates.

In the *Wochenblatt* Herr Birfelder discourses on collodions, but he has nothing strikingly new to tell, except his amazement at a friend of his who, in speaking of instantaneous collodion, defined an instant as five seconds. As a good collodion for landscape work, very sensitive and moderately quick acting, Herr Birfelder revives Dr. Reissig's formula, which he finds the best of the many he has tried:—Place 192 grammes of alcohol in a shallow vessel, and rub down in it, until they dissolve, two grammes of iodide of potassium, two grammes of bromide of cadmium, and four grammes of iodide of cadmium. The solution takes place with ease when all the three salts are placed in the vessel together, as otherwise iodide of potassium does not readily dissolve in strong alcohol. When all is dissolved add, first, two or three grammes of cotton and shake well; then add 200 grammes of ether, and shake again until the cotton dissolves. Let it stand for about an hour, and then pour a little on a plate and test its quality with the finger nail. The nail should cut the film readily, and no skin should form to dissolve off in pieces. If a skin form add a few drops of distilled water and let stand for a few days. If all the chemicals are pure this collodion should be colourless, but a little clear yellow colour does not do much harm. When the colour is too dark put a strip of metallic cadmium in the collodion, and the fault will soon be rectified. The collodion is strongly iodised, but if it give too weak an image add a little more pyroxyline. Herr Birfelder is further of opinion that a thick film always gives a softer picture than a thin one.

In the *Archiv* Dr. Richard gives the following directions by scale for regulating the gradation of light and shade in photographic portraiture. He would commence by constructing a scale like the accompanying, the perpendicular line of which is to be eighteen centimetres high and the transverse line fifteen centimetres long—nearly the natural size of an ordinary head as seen against a background:—

To obtain a well-lighted, full-face study from a head he would place it so that on the transverse line—

A from 1 to 6 would be in the shade,
B from 6 to 12, or even 14, would be the half-tones,
C from 14 to 15 would be the high light.

On the perpendicular line—

A¹ from 3 to 10 would be in shadow,
B¹ from 10 to 18·5 would be in the half-light,
C¹ from 18·5 to 20 would give the high light.

It must be observed that the lowest point of the perpendicular line is numbered 3, because in intensity of shadow it corresponds, not to No. 1 of the transverse line, but to No. 3; so that the intensity of shadow represented by 7 to 1 of the cross line is greater than by from 12 to 3 of the perpendicular scale. For a three-quarters the perpendicular lighting remains as before, but the cross line runs thus:—

Shadow	1 to 9·5
Half-light	9·5 to 13·5
High light	13·5 to 15

In the *Mittheilungen* Herr von Stefanowski has something to say on the reticulation of the carbon film. As the result of a prolonged series of experiments he is convinced that reticulation only shows itself on certain kinds of tissue, namely, upon tissue prepared with light and easily-dissolved gelatine, and never upon tissue prepared with strong gelatine, which is difficult to dissolve, unless the latter contains either an intentional or accidental addition of organic matter.

In the course of his remarks, which are to be continued next month, he distinguishes three different sorts of reticulation:—

1. A granulation in the form of more or less regular polygons, visible to the naked eye, and which increase in size in proportion to the thickness of the picture film.

2. A fine network of broken lines, the size of the meshes of which has also a certain proportion to the thickness of the film. This second sort of reticulation occurs oftenest on carbon pictures developed upon collodionised glass plates.

3. A course, irregular network which appears especially on the edges and shadow parts, and separates the picture from its support. This appears everywhere, but preferably where the collodion substratum, which secures adhesion, is wanting.

In the *Polytechniches Notizblatt* Professor Böttger writes—"The iron thrown off by electricity from certain iron double salts appears particularly adapted, on account of its property of extreme hardness (exceeding even that of steel) to the purpose of covering, with a polished iron surface, copper plates intended to be engraved or for artistic printing plates. In this way the necessity for the troublesome and tedious multiplication of such plates in the galvanoplastic manner is avoided, and when, after long use, the plate is at last partially deteriorated by blackening, the thin snrface coating can be entirely removed by acid and renewed again in a few minutes. For this so-called steeling of the plate one has until now used almost exclusively the ferric sulphate of ammonia, which I first discovered and warmly recommended. I have lately observed, however, that an iron solution, prepared as follows, is even better adapted for this steeling process. Dissolve in—

Distilled water	200 c. c.,
Ferrocyanide of potassium	10 grammes,
Tartarate of sodium and potassium	20 ,,

and add a solution of ferric sulphate—three grammes in fifty c. c. of water. This will cause a copious discharge of ferric-ferrocyanide (Berlin blue). Now add to the whole mixture, drop by drop, stirring all the time with a glass rod, a solution of caustic soda, continuing until the blue precipitate has disappeared again, leaving a perfectly clear, slightly-yellow fluid, which can at once be used for the steeling operation in question. This fluid may also be used for dyeing cotton yarn and webs a beautiful blue, without the usual accompaniment of a mordant. For this purpose the material to be dyed is placed in the slightly-warmed fluid until it is quite saturated. It is then dried in air, and is finally laid in dilute sulphuric acid (1·50). After being properly washed and dried it is of a beautiful blue colour.

ON THE APPLICATION OF ART TO PHOTOGRAPHY.

Nothing tries the art-skill of the photographer so much as the posing of a group. Generally the amount of unsuccess is almost proportionate to the amount of attention and skill (?) which has been brouht to bear on the task. Then is exhibited the incapacity of photographers to bring into their pictures any motive of action, any intention, any story; or, if any motive be apparent, it is only as evidence of a good intention gone very wrong.

Where the figures of a group have been stacked up against a blank, bare background, in rigid and uncompromising up-and-downness, there is an un-care apparent which deprecates criticism, because it is known full well that the author of the picture is not likely to be affected by any critical strictures on his production.

Then there is the orthodox mo le of grouping two persons—generally this kind of picture is called for by a couple tending toward matrimony—the man seated looking to the right, the lady standing bolt upright behind and looking to the left, her hand resting affectionately on the shoulder of the sitter. A load of care seems to cloud the brow of the gentleman, who looks thoroughly wretched and out of place, mean, and uncomfortable, as if he felt it was not quite the correct thing to be seated whilst the fair and beloved one has to stand. This picture is generally outrageously at variance with every rule of art composition; and, apart from its mistakes, it has the merit of being thoroughly silly. Variety reverses the order of things in giving the lady the chair and directing her eyes to the right, the gentleman with his face turned to the left, standing stiff, awkward, and more uncomfortable than before. You know the sort of "composition" I allude to. Why in the name of all that is gracious are such things made?

Then as the number of the group is increased so does the monstrousness of the exhibition. The family group, for instance, introducing the last new baby! The group of good fellows who are out on an expedition of fun! Well, these things as a joke may have their ordained place in the economy of providence, and may be smiled upon as a joke—not, perhaps, of the most refined kind, but still a joke! To art, however, it is an insult, and photography cannot but suffer in being made the vehicle of such pleasantries.

Groups are at best very difficult of artistic arrangement—primarily, from the peculiarities and shortcomings of the photographic lens and the necessity of arrangement of each individual in the group in a special manner to secure the best points of likeness. Then, again, to get equality of illumination and sharpness—points most difficult of attainment, and increasingly so as the number of the group is enlarged. But in an artistic sense all these difficulties assume such gigantic proportions as to render almost impossible any reasonable motive or intention in the posing of the group.

The great art in composing a group is in so managing the arrangement of the figures that they may have some reason for being placed together—some definite and perceptible relation to each other. It is *something* when, as in photographs of a certain stamp, a bottle and glasses placed on a table appear to supply this motive for the sitting; but then, generally speaking, everybody is looking everywhere rather than at the bottle, and even this not too-elevated *raison d'être* is lost. The group has the appearance of being disturbed at an orgie by an earthquake or explosion.

There should be some rational bond of union between the members of a group—something in which they are mutually interested. This, it need hardly be said, were, as a higher claim of art, better *suggested* rather than portrayed. The figures should not be scattered over the plane of the picture, but skilfully massed together. The consequence of too great scattering is that the eye is worried in seeking out the portraits, and thus the intention of the composition is killed.

I have dwelt somewhat on the effect of heads being turned in opposite directions, nor do I desire to suggest that all the heads should be turned to one point. It is not necessary, even where a conversation is suggested, that the pictured speaker and listener should directly face each other. In real life, and in important conversation, we often find the faces slightly averted, but still there is an attitude of attention and earnestness maintained through all.

I have seen some photographic groups that were pictures, *but not many.* Wm. Heighway.

—*Photographic Rays of Light.*

Our Editorial Table.

English Landscape Art in 1878.
By Alfred Dawson, F.R.A.S.

Mr. Dawson takes a more hopeful view of art progress than he did in his review of the position of landscape art last year. While he believes artists to be truer to nature, there appears to him to be room for complaint on that most important point—dignity of subject. The meanness of many of the landscape subjects is, indeed, something for condemnation. He passes in review the Society of British Artists, the Grosvenor Gallery, the Royal Academy, the Old Water-Colour Society, and the Institute of Painters in Water Colours. Mr. Dawson's strictures are racy, and bear evidence of thorough honesty. To the majority of his readers they will stand approved on account of their truthfulness.

Manual of Microscopic Mounting. By John H. Martin.
London: J. and A. Churchill.

This useful work has passed into a second edition, and it may very safely be affirmed of it that it has an important career before it. For ourselves, we gratefully place on record the fact that we have received much benefit from a careful perusal of Mr. Martin's practical lessons in the selection and mounting of objects for microscopic study. To photographers who pursue the fascinating occupation of reproducing on a large scale the wonders of the minute world this work is simply invaluable, for we need scarcely say how much the beauty of an object is enhanced by being properly and tastefully mounted. Mr. Martin adopts the useful *rôle* of not aiming at fine writing, but of imparting sound, practical knowledge. It was only the other day that we wished to prepare some blood corpuscles for photographing. Previous to doing so we consulted this work, in which we found the following lucid directions:—"The best method of mounting so as to show the corpuscles of blood well is to take a drop of fresh blood and spread it evenly, in as thin a layer as possible, over the centre of a glass slip, and allow it to dry; then mount in the dry, transparent method, or use the vapour of a two-per-cent. solution of osmic acid; then apply one drop of acetate of potass, and cover with thin glass as usual. * * * In spreading them evenly and thinly it will be as well to use a small piece of thin glass moved over the centre of the slip with a circular motion." There is more on this subject, but what we have quoted suffices to show the practical manner in which tuition is imparted.

One of the finest objects that can be shown by means of polarised light is a salt with which photographers are most intimately acquainted—the bromide of cadmium. We have failed in preserving the crystals, when prepared for the microscope, by means of Canada balsam; it absorbs the water of crystallisation, and by leaving the arborescent formation anhydrous destroys its beauty. From this work we learn that castor oil is the proper medium in which to preserve and mount such crystals.

All microscopists recognise the charming appearance of "crystals of silver" when mounted as an opaque object. This name, although in common use, is not quite correct. *Arborescent metallic silver* conveys a more accurate idea of its physical condition. To make this lovely object Mr. Martin recommends that a piece of copper foil be placed on a glass slip, a slight wall of wax made round it, and a little nitrate of silver poured into the cell thus formed. He follows this up by the requisite directions for washing and mounting the crystalline or arborescent deposit thus formed. While making some experiments in this direction we found that the finest crystals, both in form and colour, are obtained when a small bit of tin is placed in a solution of nitrate of silver. The reduction of the precious metal takes the form of a tree with branches of dazzling whiteness and singular beauty. This experiment should be tried by every photographer possessing a microscope, even if it be one of the most common class.

The work under notice is one of great utility to the microscopist, and, as we have said, it possesses exceptional value for the photographer who, incited by the noble examples in the last photographic exhibition, devotes his attention to this department of photographic art. It is copiously illustrated and well "got up."

Carte Portraits. By Silvester Parry.

Mr. Parry has sent us a selection of beautifully-executed *carte* portraits, showing fine modelling and softness. We should, however, have greatly preferred receiving prints from the negatives before they had been entrusted to the hands of the skilful retoucher, who has undoubtedly left his mark upon the faces of his sitters. But whether it is to science or to art these prints are mainly indebted they are certainly charming productions. Among the "subjects" is a fine dog, who has been instantaneously "caught." The expression is capital.

The University Magazine.
London: Hurst and Blackett.

The illustration in the August number of this popular monthly periodical is Mr. Charles Darwin, F.R.S. It is from a negative by his son, the recently-elected Honorary Secretary of the Photographic Society of Great Britain. The biography and photograph are alone sufficient to cause this number of the *University Magazine* to be greatly sought after.

In an article, *An Aryan Ancestor*, presumably by the accomplished editor, those who have had doubts as to difficulties in understanding the distinction between definite numbers of days as expressed by writers in the Sacred Scriptures and what our more advanced common sense tells us is proper, will here find a very satisfactory explanation of apparent discrepancies.

Meetings of Societies.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

An ordinary meeting of this Society was held on the 21st June last,—Dr. Vogel in the chair.

A provincial member sent some prints which were covered with numerous small brownish-yellow spots. He had been troubled with these spots for a long time back, but could not attribute them to the paper, as he had tried various sorts without getting rid of the spots, which made their appearance in the toning bath. He had, therefore, orwarded the prints, and asked the advice of his *confrères*.

Herr Prümm thought the cause of the failure lay in the use of too strong a gold bath.

A letter from Herr Herrmann was then read, in which he gave an account of a Siemens' dynamo-electric machine which furnishes a light equal to that of 4,000 to 6,000 candles, the cylinder performing 650 revolutions per minute. This machine is used for producing electric light by which to photograph.

Herr Prümm said that, in consequence of the improvements introduced into the dynamo-electric machine by Herr Siemens, electric light would soon be much more used than one would have thought possible a short time ago. He then spoke at some length of its applicability to the lighting of streets, &c.

The President then remarked that Herr Siemens was convinced that in time electricity would be laid on in houses like gas and water, and be used for both lighting and cooking as well as for motive power for various purposes.

Herr Prümm gave an account of his visit to the photographic department of the Paris exhibition and of a visit to Herr Voigtländer's establishment in Brunswick, both of which were listened to with marked attention.

The President then read a letter from M. Boissonnas about M. Klary's rapid negative process now being exhibited at the studio of M. Franck de Villecholes, Paris, and advised any of the members of the Society who might be visiting Paris to call at 18, Rue Vivienne, and report on their return to Berlin. He (the President) himself thought that, though sensitiveness might be increased by an addition to the silver bath or collodion, it would most likely be at the expense of the permanency or some other valuable quality in the picture.

The meeting was shortly afterwards adjourned.

Correspondence.

A Visit to the Blue Mountains.

"Once in a blue moon," was an expression that I remember having heard when I was young, but I really never anticipated being in its vicinity. I am not sure, however, if I am not nearer to it now than I have ever been before. Now I fancy hearing you say to yourself, "What on earth has this to do with photography? This is a very natural question, and easily answered. I have been staying in the Blue Mountains and only returned to Sydney last night, having left behind me what I consider to be some of the most splendid scenery in the world. If you think my photographic tour interesting for your readers—*voilà mon histoire*.

The Great Western Line of N. S. W. runs through some of the most varied and interesting scenery in the country, and, passing by the mining and manufacturing districts, affords ample scope for the man with the "thing on three sticks."

The government here having decided to bring out a guide to the line, I received orders to prepare for a journey down west, and on the 11th of April, 1878, your humble servant, in company with the geological surveyor, Mr. E. Wilkinson, and his able assistant, Mr. H. Young, and party, took his seat in the 9 a.m. train for the Blue Mountains. We soon left the queen of cities behind, passed rapidly through its varied charming suburbs, stopped a minute or so at Paramatta (the land of fruit, especially oranges), and by 11 o'clock found ourselves mounting the zigzag. We had to get up to the pass on the mountains—a height of about 4,000 feet—and to do this the train has to travel up stupendous works called "zigzags," which are cut out of the side of the mountain. Nothing can possibly exceed the effect of wonder that these gigantic works produce. It seems as if the genius of man had been in a severe contest with nature, for one hardly knows which to admire most, the beautiful forest of trees all around, mountain after mountain covered with the renowned eucaliptus, or gum tree, while here and there are to be seen the malleluca, acacia, banksia, casuaina, &c., &c., broken up in a thousand places by huge masses of rocks of the most fantastic shapes and colours, with innumerable chasms or gorges making so many valleys that seem filled with a most exquisite blue atmosphere (from whence comes the name "Blue Mountains"), whilst in the now far distance we have left behind us is the lingering form of the plain, looking like a mere cloud, and one is lost in amazement at the extreme beauty of the scene, or at the masterly and superb work of man's creation that is frowning down on all around, so massive and immense that it seems to reign supreme—one of the greatest engineering triumphs of the present century

After leaving this never-to-be-forgotten wonder we pass through the lovely valley of Lithgow Bovenfels, of which you will hear later on. Suffice it here to say that this is the seat of the future Birmingham of Australia. Here are copper, coal, iron mines, iron works, smelting works, terra cotta manufactory, drainage pipe works, &c., and the Australian cloth manufactory (tweed); but our destination is the township of Tarana, so on we go for another hour, till we hear the welcome whistle of the engine, which bids us collect our coats, rugs, &c, and *nous voilà* at Tarana.

After breakfast we got the apparatus ready and started off for the Crown Rocks—a very fine ridge of rocks from where were first seen the plains of Bathurst. The story goes that in the days when the convicts were making the roads near here one of them escaped and made his way up the mountains. In the morning he climbed up the rocks and from the highest point he thought he could perceive the sea, imagining it to be the other side of the island. He at once returned to his officer, gave himself up, and told what he had seen. A party went out with him, and, being provided with glasses, found it was a most beautiful plain. He received his pardon, and the ridge of rocks was called "Evans's Crown" (after him). Since then Bathurst plains have become very valuable, Bathurst, the city of the plains, being one of the most flourishing towns in N. S. W.

We got up to the rocks, and were not long in getting a few very good negatives. I worked almost entirely by the wet process, but have taken out some of your latest coffee plates, with an alkali. In the evening we forgot all about photography, took out our guns, and by most beautiful moonlight went in search of some opossums. These pretty animals sit up in the branches of trees, and by getting them between you and the moon you get a very good shot at them. Their skins shine like silver from the reflection of the moon.

At ten a.m. the next morning we got everything packed and started off in buggies for Oberon (please not to confound this with a city of the same name in fairy land). We took our portmanteaus with us in the buggies, as also my chemical chest. The apparatus, &c., tent, and extra stock were packed in a spring cart, while the heavy materials and camping arrangements followed in a bullock team, my assistant coming on behind to see that nothing was forgotten. Oberon is a picturesque little town with two comfortable hotels, two places of worship, and several shops or stores. On Tuesday, all being reported in "ship-shape," we left for the Great Fish River caves. We got now further into the bush, and soon were going not on roads but tracks. We passed two teams—one of twelve and the other of ten bullocks—up hill and down valley—jolt, jolt, in and out the trees, full of interest to the "new chum" (all new arrivals are new chums), and at last, at five p.m., we reached the edge of the ridge from where we were to make the descent to our camping ground and the mouth of the caves.

Have you ever, Messrs. Editors, stood on the golden gallery above the dome of St. Paul's Cathedral? If so, imagine that instead of a smooth surface it was covered over with massive pieces of rock, and instead of a distance to the bottom of some 300 to 400 feet it was 1,800 feet; you will then be able to picture to yourself the task we had before us. Yet what a beautiful task! Nature seems to have here chosen one of her most lovely spots, for before you lies a vast amphitheatre, mountain after mountain covered with the everlasting gum tree, mixed up with rocks as grand as they are immense, and rising up in all directions, making huge, ugly precipices eight to ten hundred feet deep—such are the sights which greet the eye every now and again. Language indeed can scarcely describe the feelings one has on first becoming acquainted with these scenes. What immensity!

The buggies were unpacked, and the horses charged as pack horses. Each one leading a horse, we begin the descent. The way is tortuous and the incline steep, varying from 1 in $1\frac{1}{2}$ to 1 in 30. All things come to an end, so did our downward steps, for soon we saw in the hollow beneath us the camp fires of the party of surveyors from the Department of Roads and Bridges, who already had their tents pitched. Down we are. More fires are made, billies (a sort of camp kettle) are soon out, and a tent put up for the geological surveyor, his assistant, and myself.

The next day we were up by times and soon got to work. I only managed to get five negatives with hard work all day, for only those who have experienced such work can understand the extreme difficulty, being sometimes obliged to carry the plate up some 700 to 800 feet of rocky heights, it being impossible to get up a tent and chemicals. On more than one occasion the plate was three-quarters of an hour between preparing and developing. In these cases I invariably prepared my plate very rapidly, only allowing time for the formation of iodide of silver, and allowing the free silver to act on the bromide during the interim. I exposed coffee dry plates, but fear that the dampness down here will make them anything but dry.

On the morrow I made the descent into the caves with the surveyors. The entrance to the new cave is situated at about a mile from our camp, and is reached by winding along the ridge of one of the mountains, descending on the other side, when you come to an opening in the rock. This is about fifteen feet high, and in we walked to the antechamber, where we arranged our dress and lit our candles. *Apropos* of dress, any dirty old clothes will do very well, but having made the journey I should recommend a sack as being the best thing. Make a hole for the head to go through and two for the arms; when in position sew up round the legs and proceed. This matter arranged, we commence our journey along a sort of corridor, with a very rough, rocky bottom. In a minute or so the end of this passage is reached, and the first ladder has to be descended. We eventually find ourselves at the bottom, and can now look round and by the dim light of our candles enjoy the magnificent sight before us. It is an immense cave of from 150 to 200 feet; masses of rock lying pell-mell in every direction, varying in size from five to fifty feet, with shapes the most fantastic, meet the eye on all sides. Imaginary beings are called into view as you hear the cry of the bats and see them in multitudes. The hall traversed, we again find ourselves in a sort of passage very difficult of access, the rocks being slippery and steep. This ushered us into the cathedral—a beautiful hall full of fine stalactites and masses of thin rocks, resembling sheets thrown over a wall. In another part one might imagine himself in a vast theatre, the stage being formed by another and smaller cave, supported on either side by pillars of limestone and stalactites. It is from this point that one of the most difficult parts of the *trajet* is reached—the descent to the Bride's Cave. The great peculiarity of this cave consists of the singular formation of crystals, being shaped in the most fantastic manner possible; but it hardly pays for the amount of exertion (to say nothing of the fear) taken to get to it. The return from the cave was simply a tremendous bodily exertion.

Off again—climbing, squeezing, tumbling, falling, until you reach the couch. Here we lit some magnesium and saw the big cathedral, which is surpassingly grand and terrible. Looking into this darkness made light one sees, as it were, a long, thin, black-looking line reaching from almost the top of the cave to the bottom, but not in a straight line making an elbow (thus $<$). This the guide calls the "big ladder." If he had called it the "devil's ladder" it would be very appropriate, for it is fearful to see oneself standing there in mid air and right over an immense water hole. Up this we had to go to reach the Lurline Cave, and I must confess that I was not sorry to find myself safely landed on the pulpit rock, thanks to the kind help of Mr. Young and Mr. Cambridge, for there was only a thin metal wire ladder between your correspondent in possession of his body *en bon etat* and his having every bone in his body broken. More scrambling up and the beautiful Lurline Cave is reached. After examining it well to select some spots for photographing we again started off, and once more found ourselves at the mouth of the caves; but daylight had fled, for we had spent twelve or thirteen hours in these mysterious caves. Along the solitary track we wind our way, soon see our camp fires, and hungry and tired out we take a hearty meal and turn in. After two days' riding we reached the Lithgow valley—as I have already said, the future Birmingham of New South Wales.

The town has been quite recently built. Six years ago there did not exist a single house; now there are several good hotels, a bank, two churches, stores, and a goodly sprinkling of houses. The manufacturing part consists of iron works, rolling machines, terra-cotta works, brick making, copper smelting works, and several important coal mines, as also a tweed or cloth manufactory at Bowenfelt, about a mile and a-half from Lithgow. I commenced my photographic labours with the Lithgow valley colliery and terra-cotta works, and got some very nice negatives. The next day the Lithgow valley iron works became the object of my solicitude. The Hermitage, Eskbank coal mines, and copper smelting works took me another day; then came the tweed factory, and away off in a buggy for Hartley, the scene of the kerosene shale mines, from which is made the kerosene oil. I left this very interesting place two days after for the great Zigzag, where I obtained some very nice views. I now prepared my apparatus for two very important pieces of work. The first of these, called "Govett's Leap," is reached by following up a track from Blackheath through an uninteresting scrubby forest for about two miles, when you find yourself at the edge of a gorge hemmed in by perpendicular cliffs of sandstone lying in horizontal strata varying from 600 to 800 feet high. The width of the gorge is about one and a-half mile, and its length in a straight line three and a-half miles. The waterfall known as Govett's Leap is about 600 feet deep. From the nature of the place photographs give but a very poor idea of its grandeur, it being impossible to get good positions to photograph it from.

We next visited the falls of the Weatherboard. An hour's walk brought us to the edge of the cliffs, where we pitched our tent, and a descent of some 200 feet allows one a fair view of the falls. The scenery around partakes of the same character as that of Govett's Leap, but if possible more grand, the surrounding masses of rocks being more perpendicular and on a larger scale. As there was very little water the effect was not such as I had anticipated. I obtained only two negatives, taken at great disadvantage.

It would only be repetition were I to tell you more of Blue Mountain scenery. Suffice it to say—more particularly for those who know the country—that from the Penrith station to Bathurst I visited all the spots of renown on the western line, including the picturesque Weatherboard cottages of Sir Henry Parkes, K.C.M.G., Sir James Martin, Dr. Badham, and others, all of whom showed me the greatest kindness and hospitality. Picton, Goulburn, Murrum-burrah, Cootamundra, and Bethungra (all on the southern line) afforded a little work for the camera, but this part of the country is not so favoured by nature as the west. The unsettled state of the weather now compelled me to make a halt at about 270 miles south of Sydney. This halt proved to be a final one, so with wind and rain I turned again towards the Queen of the Pacific, and have arranged my negatives, from which I enclose a few unmounted prints.

I here give, for the benefit of your readers interested in the subject, the necessary formulæ for making the plates to be engraved by a needle point, and subsequently treated by photolithography or any engraving process preferred. I see by a contemporary the process is likely to be called by a new name and brought forward as new. I worked it in Belgium nine years ago. The original process was by M. Toovey. We used to call it "heliolithographic" in Belgium, and worked it with success among the artists for a time, when it declined as rapidly as it had taken root. This was in 1870-1-2. Here is the formula:—

White wax	80 grains.
Lithographic varnish	3 drachms.
Benzole	$3\frac{1}{2}$ ounces.

Dissolve the wax in the benzole and add the varnish; clean some glasses of any size, as required, and spread a very little of the solution on a stone, such as is used for rolling-up printers' ink. Now, with a lithographic roller, lay on to the glass a *very thin* coating of this varnish while still wet; shake over powdered orange chrome through a very fine sieve, and, when covered, dust it about on the plate with a dusting brush, softly and with a rotary motion; let it dry, when flow over it the following:—

Turpentine	$3\frac{1}{2}$ ounces,
Lithographic varnish	$1\frac{1}{2}$ drachm,

and let run back into a bottle, as when varnishing. When evaporated dust over, in the same manner as already given, the white colour known as "blanc d'argent;" place it aside to dry, when it is ready for the etcher or engraver. This is done by a needle point or any other instrument preferred; it is then treated by photolithography or any of the engraving processes. The photolithographic process of M. Toovey gives results equal to engraving, and, when printed on *papier de Chine*, the prints have often been taken for engraved proofs. I am now working out another mode of preparing the glass, which I will describe in my next communication.

The carbon process is decidedly making way. We have been favoured with a visit from Mr. B. J. Edwards, who has been giving lessons in enlarging and carbon printing to two or three of the leading portraitists here. He is now in Melbourne, and intends making another short visit prior to leaving for the old country again.

I think a new era is opening to us poor black paper printers. One thing is certain—that carbon printing is making good headway, and bids fair to become a general mode of printing. L. Hart.

Sydney, May 12, 1878.

FADING OF CARBON PRINTS.

To the Editors.

Gentlemen,—With reference to the very interesting and important discussion which is now going on in your pages with regard to this subject, may I be permitted to refer to some very fine carbon prints which have been in my possession for many years?

They were sent to me by Mr. J. W. Swan, in the very early days of carbon printing, before the birth of the Autotype Company. They have been hanging framed and glazed in my drawing-room exposed to the light at all times. They are wholly unaltered, and the whites are as pure and clear as the day they were executed. Very fine specimens they are of the process, and will compare with anything of later date.

I may add, too, that I have some charming specimens of the Woodburytype, also of an early date, and these, hanging under similar conditions, are as fine and brilliant as they were when first turned out—no fading or alteration in colour whatever.

I see the Autotype Company attribute the deterioration in carbon prints to the paper. Whether this be so or not I do not venture an opinion, but I simply refer to the above specimens as proof that carbon prints, whether in the form of carbon printing proper or in the form of Woodburytype, do not necessarily go to the bad.—I am, yours, &c.,

Society of Arts, John-street, Adelphi, P. Le Neve Foster.
London, W.C., August 9, 1878.

THE FORTHCOMING PHOTOGRAPHIC EXHIBITION.

To the Editors.

Gentlemen,—I do not think it possible to have passed a more suicidal resolution than that recently adopted by the Photographic Society of Great Britain, by which exhibitors not being members of the Society are to be charged for wall space. A very large proportion of exhibitors are amateurs who gain nothing by exhibiting, and they have already heavy charges for framing, printing, carriage, &c., and all for the benefit of the "Parent" Society (defend me from such a parentage!).

If the rule be permitted to stand good I think the amateur contingent will be very small. I for one shall be conspicuous by the absence of my pictures, and I know others who will follow my example.—I am, yours, &c., Baynham Jones.

Cheltenham, August 12, 1878.

EXPOSING BY ELECTRICITY.

To the Editors.

Gentlemen,—The "Peripatetic Photographer," in his notes this week, has fallen into an error which we must ask your permission to correct.

Referring to our patent electric shutter as "a very pretty idea, and one that can very easily be carried into practical effect, especially as regards the requirements of the professional photographer who keeps his battery in a garden, or cellar, and 'leads on' the electric current into the operating-room by means of a small wire," he adds the two queries—"But what about those who have neither garden nor cellar nor even a spare cupboard in which to place the battery so necessary to the electrically-moved lens cap? What about those peripatetic photographers, like myself, who are continually finding themselves here, there, and everywhere?" He then replies to these queries under the impression that it is necessary to "conceal a tiny, yet powerful, battery inside the camera itself;" and here is the error, for this would be obviously objectionable, inasmuch as the slightest fume from such a battery so placed would doubtless affect the sensitive plate.

As manufacturers of the instrument in question we have met all the requirements perfectly by adopting the use of a small constant battery, fitted into a wooden case, detached, and placed upon the camera-stand below the instrument, but connected with it by conducting wires, so that the complete apparatus is as portable as it is simple.

Any slight fumes of the life-giving principle, *ozone*, which might possibly arise from the battery would in the operating-room be rather advantageous than otherwise.

We are not aware whether our "peripatetic" friend has himself seen the working model with which we demonstrate the action of our electric shutter, but if not we shall be happy to show it to him, and to explain (as is always done by the exhibitor) that the small carbon battery which we employ in the model is only used for the sake of greater portability, and is *not* the form of battery which we supply with the instrument. When the specification of our patent is published this will be fully described.—We are, yours, &c.,

Southport, August 10, 1878. D. H. Cussons and Co.

EXCHANGE COLUMN.

I will exchange head-rests, cabinet camera, lens, &c., for posing chair or sciopticon.—Address, Fred. Daking, Bramford-road, Ipswich.

ANSWERS TO CORRESPONDENTS.

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

Hector and Carboniensis.—Received. These, with other correspondents, in our next.

Tyro.—The firm is a genuine one. One of the members is a practical chemist of high standing.

J. R. R.—You must apply to a manufacturer of bottles such as are used by chemists and druggists.

S. E.—It is not expedient that the matter be further inquired into. We, at anyrate, decline to waste time over it.

G. M. (Ireland).—So far as we at present recollect, Mr. H. J. Newton has never exhibited any reticence in publishing freely his researches in collodion emulsions.

J. R. R. S.—The negatives are hopelessly bad; destroy them, and do not waste any more time over them. Under no circumstances will they ever produce good prints.

James Mann.—Mr. Rutherfurd was in this country very recently. We do not know his address, and we are not aware if his large photographs of the moon can be purchased.

J. P. H.—A clear, sparkling solution of gelatine can always be obtained by mixing a little albumen with such solution, and then raising the temperature until coagulation takes place.

J. E. G.—At present we are quite unable to say whether the process will be useful or not. It is probable that we may know all about it soon, after which we shall communicate with you.

Thos. Hunt.—Add zinc or silver filings to the red-coloured collodion and shake well up. This will reduce the intensity of colour, but we do not imagine that it will improve the working of the collodion.

S. Matthews.—The negative is certainly sadly deficient in sharpness, but it appears as if it were caused by imperfect focussing. You must make further trials, and, should you consider it necessary to write again, supply more detailed information than you have done.

C. M. D.—The remedy for the evil is simple enough. Now that the weather is hot remove the glass stoppers from the collodion bottles and substitute for them good, sound corks. No fear need be entertained that they will be blown out by the elastic vapour generated by the heat.

A. C. P.—Make a moderately strong solution of bicarbonate of soda, and having poured the nitrate bath solution into a clear bottle add slowly, and with intervals of shaking, enough of the soda solution to render the silver slightly opaline. Then filter and it will be in good condition.

Geographer.—We know that it was the intention of Mr. John Thomson, whose name is so well known as a traveller in China, to have proceeded on Saturday last to Cyprus, but whether he started at the time appointed or not we have not yet been informed. He was to have employed both the wet and dry processes in obtaining transcripts of scenery and life in Cyprus.

Geo. S. Stevens.—1. While the method described for ascertaining the focus of a lens is approximately accurate, it is not absolutely so. It is one of those methods that may be designated as practically, but not theoretically, correct. Had there been no refraction of the ray by the lenses it would have been quite right. If you have access to our Almanac for 1870 you will there find described a method for ascertaining the true equivalent focus of any combination.—2. The matter is under consideration.

Aliquis.—The only conditions required are—1st, the employment of a non-distorting lens; 2nd, the careful levelling of the camera; and, 3rd, the rotation of the camera upon its stand to such an extent that the subjects which are to form the line of junction between the two pictures shall in each be precisely equidistant from the centre of the ground glass. Photographs taken in panoramic perspective are much more satisfactory than those obtained in the manner you propose adopting, and in which the perspective is of a decidedly composite order, consisting, as it will do, of a mixture of plane and panoramic projection.

Received.—Robert Challenor (Liverpool). In our next.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.
For the Week ending August 14, 1878.
These Observations are Taken at 8.30 a.m.

August.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
8	30·03	114	78	59	63	68	W	Fine
9	30·14	115	79	59	62	67	WSW	Hazy
10	29·70	—	73	63	62	65	E	Raining
12	29·55	107	72	60	60	62	SW	Overcast
13	29 67	92	62	55	59	63	W	Cloudy
14	29·70	111	76	59	62	66	NW	Cloudy

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 955. Vol. XXV.—AUGUST 23, 1878.

OPALOTYPES ON EMULSION PLATES.

Of the numerous uses to which photography is applicable there is perhaps not one to which emulsions are better adapted than to the production of the class of pictures known as opalotypes, though it may be further said that no process requires a more complete alteration of its working conditions in order to secure success in that special branch of the art. This may not be immediately plain to the great bulk of emulsion workers, who, as a rule, do not belong to the class most closely interested in opal work, and who may, therefore, be presumed to lack an intimate practical acquaintance with the particular requirements of that style of picture.

It would seem at first sight that the peculiarly-delicate image obtainable with alkaline pyro. would prove all that could be desired in the rendering of softness and delicacy in the picture, and that a judicious use of restraining bromide would readily give any desired degree of brilliancy and boldness to the result. But, alas! for the vanity of theoretical anticipations! Under ordinary conditions—that is to say, employing the ordinary description of emulsion and the method of development usually adopted in landscape work—the result is found to be the very opposite. We have the choice between a delicate, flat picture, cold and poor in tone, and one in which, though the colour may be satisfactory, the prevailing characteristic is heaviness, the shadows and half-tones being inextricably jumbled up together with but the smallest amount of contrast.

The fact is that alkaline development—at least alone—is scarcely suited to the production of the class of image required. It is certainly possible with a peculiarly-favourable description of negative to secure a passable, or even a satisfactory, result; but with the majority of negatives this is not the case. Opalotypes require an *intense* image—that is, one which, while thin and transparent by transmitted light, presents strong contrasts when viewed by reflected light. Now the image produced by means of alkali is destitute of these qualities. In its earlier stages it is thin and delicate when viewed as a transparency, but totally devoid of surface colour; and in order to obtain the necessary strength to render it available as a positive by reflection the original delicacy of the half-tones is entirely lost. The difference between the two effects may be compared to that between a print upon a weakly-salted plain paper and to a paper carbon print made with special transparency tissue; or in one case softness without vigour, in the other strength without delicacy.

If we avail ourselves of silver development, or even only intensification, the result is considerably better—indeed, with many emulsions developed with alkali and intensified (or *toned* would be a more correct expression) with silver very perfect images may be obtained if the operation be conducted in a proper manner. But here another difficulty crops up, for it is found that emulsions of pure silver bromide do not work well under acid development unless free silver be present upon the film at the time of exposure; that is to say, the emulsion must contain free silver and be employed in the moist state, or, better still, the plate must be washed and flooded with a solution of silver before exposure. If used in the dry state and the silver necessary to development added to the developing solution itself the result is invariably feeble and unsatisfactory, though in this respect a bromide plate prepared with the bath behaves in a better manner.

In order to gain the full advantage of silver development it is necessary to introduce iodide into the emulsion. It is a point upon which there are divergences of opinion as to whether for landscape work the addition of iodide is an improvement or the opposite; but for opal purposes there can be none of the usual objections to its employment, while the peculiar properties which it undoubtedly confers upon the emulsion are just those which are sought for. Thus the more ready adaptability of a bromo-iodide emulsion to silver development is one point in its favour, while the peculiarly clean and vigorous image by reflected light under alkaline development gives it another claim to the suffrages of those who prefer that method. The slightly-increased trouble in preparing such an emulsion will scarcely, we should imagine, militate against its use when its advantages are proved, as they must be, by a single trial.

The mode of printing to be followed, whether by contact or in the camera, will to some extent affect the choice of emulsion to be employed; thus those who confine themselves to the production of enlargements or other descriptions of work in which the camera is utilised have the option of employing wet plates, in which case, for the reasons we have stated, a simply bromised emulsion specially prepared will answer all purposes. Those who print by contact are confined to dry plates, and we should strongly recommend in their case the admixture of a certain proportion of iodide, which will not in the slightest degree interfere with the capabilities of the preparation when used wet.

The only special preparation necessary in the bromide emulsion is to avoid any attempt at rapidity—*i.e., extreme* rapidity. An excess of from half-a-grain to two grains of soluble bromide should exist in the emulsion; if it is to be employed wet with a wash of silver the larger quantity will be preferable, but otherwise the smaller will be found sufficient. The collodion should be allowed to "ripen" in the bromised state or the results will be cold and poor, owing to the absence of the so-called organic silver compound. Newly-made collodion works very differently in this respect with excess of silver and of bromide respectively—at least when the latter is in excess throughout. The quality of the emulsion as regards cleanness and brilliancy of image will be further improved by the following mode of sensitising. Having calculated the necessary quantity of silver necessary to leave the desired excess of bromide, add three-fourths of it in the usual manner dissolved in hot alcohol, and after thoroughly mixing allow it to stand for several days, or even weeks, to mature. In this state it will keep unchanged for months, or perhaps indefinitely, and only requires the further addition of the remaining one-fourth of silver to fit it for use in a few hours.

If the opposite course be pursued and the emulsion be permitted to rest under the action of free silver for part of the time it is sensitising, it will be necessary not only to acidify it but also to allow a considerable time to elapse after the final addition of bromide before using it. Unless this be attended to, though possibly it may not "fog" in a sense which would prove objectionable in landscape work, it will produce a sufficient "veil" to entirely destroy the purity of an opal.

Having prepared the emulsion the remainder of the work is simple enough. After coating the plate it is immersed in a dish or dipping bath of any ordinary water not badly contaminated with chlorides or carbonates. A plain thirty-grain solution of silver rendered slightly acid is then flowed over it two or three times, and it is ready for exposure, requiring the same subsequent treatment as a wet bath plate, without the corresponding liability to stains and uncertainty. As regards the development of these plates it is impossible to say much within the limits of this article, beyond reminding those who have had no experience with plain bromide plates that they differ in the style of treatment required from bromo-iodised films. Not that the results are in any way inferior when a slight experience has mastered the peculiarities; but we think it well to advise our readers not to relinquish the attempt, as many others have done, in trying bromide plates for the first time, because they do not succeed at the first trial with their ordinary developing formula. Either iron or pyro. may be used, but the latter gives the best tone.

Instead of applying the wash of silver, the plate upon coming from the water bath may be exposed at once, and developed with alkali, such an emulsion as we have described giving, with silver intensification (or toning), very pleasing results, though rather cold in colour. In the latter respect an improvement may be effected by applying an organifier to the plate either before exposure or immediately after. Tannin, coffee, tea, or a very weak solution of quinine, may be used according to the tone desired, the last giving a very pleasing purple tone, and after a little practice rendering the use of silver unnecessary.

The preparation of the bromo-iodide emulsion requires no very special comment. If for employment wet it must contain soluble haloid in excess, while the contrary is the case if dry plates are to be used. The excess of haloid renders it very insensitive unless treated with the wash of silver as we have directed, particularly so when used dry. It is remarkable that, unlike a bromide emulsion, an iodised one requires a considerable excess of either silver or haloid to keep the iodide in suspension; if the proportion be nearly balanced very great trouble will be experienced in securing proper emulsification. The proportion of iodide to bromide is, for opal purposes, immaterial, but the former may be raised considerably above the standard usually recommended in landscape emulsion.

The modes of development applicable to bromo-iodide emulsion are the same as for bromide, but the behaviour of the plates will be found to approach more closely to ordinary bath plates under silver development; indeed, where the wash of silver is given, previous to exposure, it is difficult to see in what respect the emulsion differs from the bath plate. The dry bromo-iodide films, if the proportions of iodide and bromide be about equal, or if the former be in excess, are also amenable to pyro. and silver development, which is, perhaps, *the* best mode of treating them; unless rapidity be an object, iron and silver do not answer so well. Where greater rapidity is desirable with the dry plates, either alkali or ferrous oxalate may be used; the presence of the iodide altogether changes the character of the image, and in the majority of instances renders silver toning almost, or quite, needless.

In all cases where alkali is to be followed by silver it is important not to carry its action too far. Let a full exposure be given (without overdoing it), and employ a well-restrained developer in order that the image may appear slowly. As soon as the required amount of detail is out wash off the alkali and proceed with silver for the remainder of the operation. If too much be done with the alkali, though the image may appear clear and vigorous, it is nearly certain to acquire a slight veil, or to have the shadows rendered heavy under the subsequent action of the silver.

We have seen a considerable quantity of opal work produced by means of emulsions, and can truly assert that it is in no way inferior to the best that can be produced by other means. The testimony of two professional photographers, who have entirely discarded the bath for this class of work, is to the effect that the change has brought about a saving both in time and money, and is also conducive to more uniform results.

DISCOLOURATION OF PAPER IN CARBON PRINTING.

The useful discussion upon the "fading" of carbon prints has already had its beneficial effects in causing special attention to the quality of paper employed as the final support for the picture, as a reference to our advertising columns will show. It is well that it should be so; for, at least with work not possessed of that extreme glaze so much sought after by some, the tendency of carbon prints, even when first executed, is to show a little deficiency of purity in the whites and the highest lights. This fault is one to be guarded against as much as possible, for in carbon pictures possessing a low glaze there is a general tendency to flatness, than which nothing is more likely to prejudice a photographer against taking up carbon, accustomed as he is to the beautiful richness and depth of shadow, and the absolute purity of white of silver prints of all sorts.

The Autotype Company have laid a very potent spirit of destruction in their discovery of the discolouration by light of the paper itself, to discover which is practically to find its cure. May not silver printers also look to the same cause as the origin of some of the so-called "faded silver prints?" But hitherto no one has discovered a complete remedy for that special discolouration—the staining of the single transfer-paper when once the tissue has been squeegeed upon it. This is an evil of the first magnitude, and considerably restricts the range of carbon printing as to variety of application; but beyond this it is a positive loss to the brilliancy of the image, for though India-tint engravings may be instanced to the contrary, it is not a fair parallel, and such subjects as small carbon vignettes with white grounds are virtually relegated to the region of experiment.

We are aware that the evil may be evaded by avoiding the use of such tints of tissue as experience prove to possess these evil qualities; but our range of tints would then be too restricted. The proper course is either for the makers to provide us with the due variety of tints made with non-staining pigments or to find out some method of using the tissue so as not to stain, or of discharging the colour when it has stained in the usual manner. The latter is, however, next to impossible, for the agent which is to discharge the dye—as it may be termed—from the paper would be almost certain to take it away also from the body of the tissue pigment. We have tried many papers and looked at many prints, but have almost always been able to discern in a picture of a purplish tone the faint pink stain from the washed-away tissue in the highest lights. With such tints as the black to imitate engravings, sepia, red chalk, &c., this particular stain is naturally not observed, but we would have the whole range of possible tints available to the photographer, and this, we do not doubt, will ere long be done.

We can already hear in anticipation some of our readers pointing to the now well-known carbon picture—the chromotype—and asking if they were stained, and to them we would, in anticipation, reply that our remarks merely refer, as we intimate, to single transfer. As a rule when a double transfer is made the colour forming the stain will be found in the original support, and the double transfer picture almost free from stain or discolouration. But this should not be, as we consider there ought not to arise the slightest difficulty in this direction in the use of either single or double transfer at all. We have tried a number of experiments lately, but the only method which so far has enabled us to touch the stain without injuring the colour of the picture has been to flood the sheet with ammonia. It will often take almost the whole of the stain away. This we have found very useful in printing upon opal glass. We have rarely seen a good vignette in carbon with a white ground, and as this is a style of printing much liked for *carte* and other small work we are inclined to think that so far others have also found the difficulties to be too great.

There is, of course, one other cause for the prevalence of a slight tint upon the whites of the picture, viz., that even in the highest lights there is generally a film or skin of almost infinite tenuity, as, if there were not, we are inclined to think the tissue film must wash up and spoil the picture; and, no matter how slight the film, it must contain *some* colour, as it is the whole film itself, not the colour alone, which is washed away in the developing. The older the tissue the more pronounced does the tint become from this cause; and, as we have on a previous occasion pointed out, the use of old tissue possesses several advantages in point of half-tone and softness, &c., that we cannot dispense with the use of it.

There is, however, a possibility which has often been present to our mind, and which we here make note of, trusting some of the manufacturers may be able to utilise it. Seeing that a slight film of pigment, containing insoluble gelatine, is always found in the highest lights, which are to that extent degraded, would it not be possible to prepare tissue with a very fine and slight final coat or wash of gelatine containing no pigment at all, but in other respects just the same as the usual pigmentised gelatine? We should then get enough gelatine to stand a slight exposure to light without injury, and in which the binding skin—as we might term that portion present in the high lights—would be free from all colour, and so enable us to have either vignette or ordinary prints free from any stain whatever in the lights; for it might be anticipated that that slight portion of the pigment which ordinarily penetrates the paper in staining would be withdrawn by the new suggested plan. We present the idea for what it is worth to the makers of tissue, feeling assured that it contains the germ of usefulness.

It will, no doubt, be observed by those who have followed our argument that the gelatine might be added to the sensitising bath instead; but this would entail the necessity of too frequent change, as every carbon printer knows the tissue gives up some of its colour to the bichromate bath. Then we have another advantage: with "the new tissue" the sensitising bath would be kept so much cleaner and free from colour, except that naturally produced by the reduction of the bichromate.

RECENT PATENTS.

No. XII.—THE SCOTELLARI EXPOSING CAP.

We are at length enabled to publish the specification of M. Scotellari's lens cap for giving auxiliary exposures to the sensitive plate while in the camera:—

The object of this invention is to reduce the time of sitting during photographic operations.

The apparatus made according to this invention is applicable to and placed on the rim of the objective or lens of the photographic camera, so that the light has to pass through it on its way to the lens.

The shape of the apparatus is cylindrical, like a box cover or frame. At or about the centre there is an aperture, wherein some transparent substance is placed, but rendered opaque, and coloured either violet, indigo, purple, or blue, so as to allow a certain quantity of photogenic light to pass through.

A cover is provided which may be turned or slid over the aperture so as to shut out the light, and thus prevent the action thereof when required.

Seeing that this patent—which is dated 14th September, 1877—received provisional protection only, it lapsed in March last. On the subject of auxiliary exposures in general, and of this method of effecting such exposures in particular, we do not now require to say anything, this having been almost exhaustively treated several months ago.

No. XIII.—FLUID CONDENSERS FOR PRODUCING ENLARGEMENTS.

No patent could, of course, be obtained for a mere fluid condenser lens, such a form of instrument having been described long since. But in the form now to be described an element of novelty has been imported into the construction of condensers, consisting in causing a stream of cold water to be constantly passing through them. By keeping them cool in this manner a powerful electric lamp may be used in the production of enlargements.

With these prefatory remarks we now proceed to describe in detail the invention which Messrs. Warlich and Cadett have patented:—

This invention has for its object the production of enlarged photographs direct from negative or positive pictures, whether in pigments or otherwise, by means of apparatus to be used with artificial light or sunlight.

For the above purpose, when using artificial light, the patentees prefer to enclose the light in a box or lantern to prevent any rays of light that are not used in the production of the image from impinging on the sensitive surface employed.

A condenser is placed at the proper distance from the light to condense the rays thereof, the said condenser being hollow, so as to allow of being kept filled with water or other liquid, and by means of an arrangement of pipes water or other liquid or solution of any substance that may be considered fit for the purpose is made constantly or at intervals to flow through the said condenser for the purpose of keeping it cool.

The apparatus which holds the said condenser has also a similar arrangement, by which liquid can be made to flow through it for the purpose of keeping it cool.

Glass condensers, in place of the hollow condensers just described, can be used for the purpose of this invention, but in such case it would be desirable to interpose between the light and glass condenser a glass trough or transparent receptacle for water or transparent liquid, having arrangements for changing or flowing the water or liquid through the same. Such receptacle for flowing the water or other liquid can be formed by making one face of the lens a side for such receptacle, a plate of glass forming the other side of the trough; or the space between the condensers, when two or more are used, may be used as a water or liquid compartment.

In cases where the heat would be excessive a trough or transparent receptacle might be used, in which the picture to be taken is immersed in water or other fluid, which is kept circulating through the trough or receptacle, or is changed by means such as described. On the side of the condenser, from which emanates the condensed rays of light, and at a proper distance from the said condenser, is placed the positive or negative picture to be enlarged, and at a still greater and proper distance in the same line a lens is placed parallel and concentric with the said condenser. The condensed rays of light, on leaving the said condenser, pass through the negative or positive picture to be enlarged, according to the several densities of its different parts, and are then taken up by the above lens, the result being that an image of the above positive or negative picture is projected at a proper focus, and the said image is made to project upon any suitable surface sensitive to light.

When the electric light is used an arrangement is, or may be, employed for keeping the light central with the said condenser and lens, which it does by means of clockwork or otherwise, and utilising part of the heat evolved from the light.

In using sunlight the box or lantern used with artificial light is not necessary, and the rays of light are projected into the said condenser by the usual means.

FIG. 1.

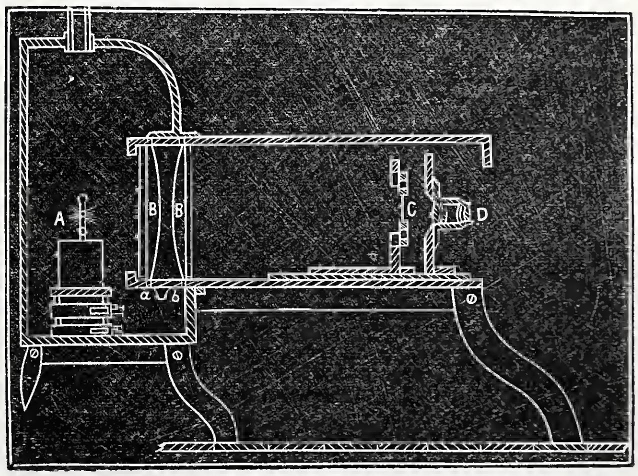


Fig. 1 shows in outline the arrangements for producing enlarged photographs.

Fig. 2 is a view in outline of arrangements for keeping the light central with the condenser or lens.

Fig. 3 shows a form of hollow lens.

Fig. 4 shows an arrangement of two lenses or condensers, with chambers at back and front.

Fig. 5 is a front view of *fig.* 4.

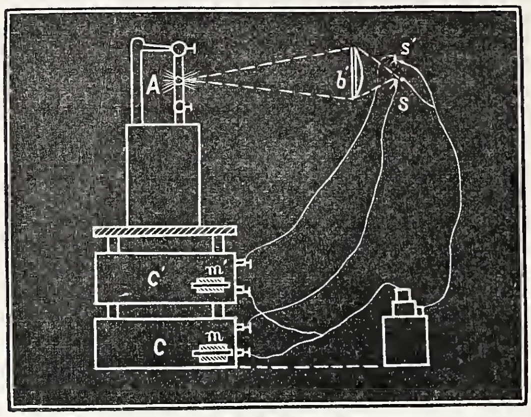
Fig. 6 is an arrangement with a separate trough or receptacle placed in front of the lenses.

A is the point where the light is placed; B, the condensers; C, position of negative or positive picture; D, lens or lenses placed parallel with the condensers B; E, position for enlarged negative.

It is to be understood that the drawing is simply for the purpose of exemplifying the method adopted, as the positions of the negative or positive picture, the lens, and the enlarged image depend entirely upon the operator and the subject to be treated.

The condenser or condensers B receive the rays of light from A, and such rays are condensed and pass through the negative or positive picture, C, to be enlarged, and are then taken up by the lens or lenses D, and projected at the proper focus to produce the enlarged image at E from the said negative or positive picture C. The condensers B are, as before described, hollow, to allow a continuous flow of water or liquid through the same, the water or liquid issuing in at *a*, passing upwards through one condenser, and thence by the pipe or other means conveyed down and into the second condenser at *b*. It thence flows upwards and out by a pipe or other means from the upper part. By this continuous flow of water or liquid through the condensers the same are kept cool and ensure the efficient working of the arrangements.

FIG. 2.

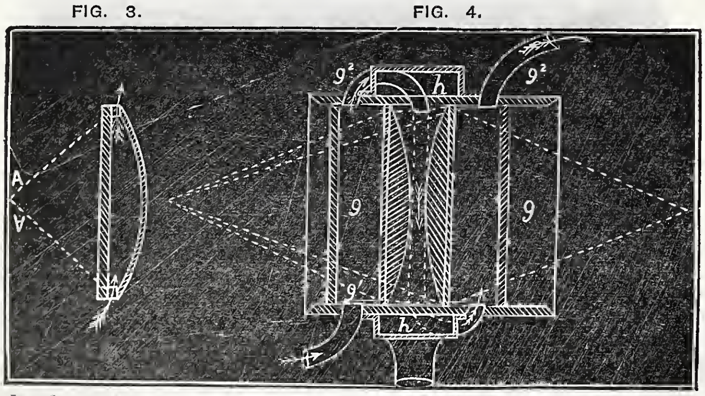


The arrangements shown in *fig.* 2 are placed so that they do not interfere with the rays from the condensers to the lenses, and such arrangements are for keeping the light central.

In any part within the path of the rays is placed a lens b^1, in front of which and at the focal point on either side thereof are springs or means, s s^1, which by the effect of the heat from the focus of the lens make contact with the electrical communication, the result being that by such contact the magnets m m^1 act upon detents which free clockwork or other means enclosed in chambers c c^1, and thus the lamp is raised or lowered to keep the light central with the condensers and lenses, as before described.

The action is as follows:—Suppose the light falls too low, the result would be that the focal point between the springs or means would rise and fall upon s^1, and contact would be made by expansion of s^1 through heat, and communication would be made by electro-magnet m^1 in chamber c^1. The detent would thus be released, and the lamp raised until the light assumed its normal position between s and s^1, as shown. If the light be too high the focal point would fall and act upon s, and, by the electrical communication, the magnet m would act upon the detent and lower the lamp.

FIG. 3. FIG. 4.



In *fig.* 3 the water or other fluid which circulates between, and in the direction of, the arrows is principally the refracting medium.

In *fig.* 4 the water or other medium flows in receptacles, of which the face of the lens forms one side, the other side being formed by glass g, which, with the condensers, is enclosed by a suitable chamber of the ordinary kind, around which is formed a hollow chamber h for the water or other liquid to flow through, so as to keep both the framework and the parts holding the lenses cool.

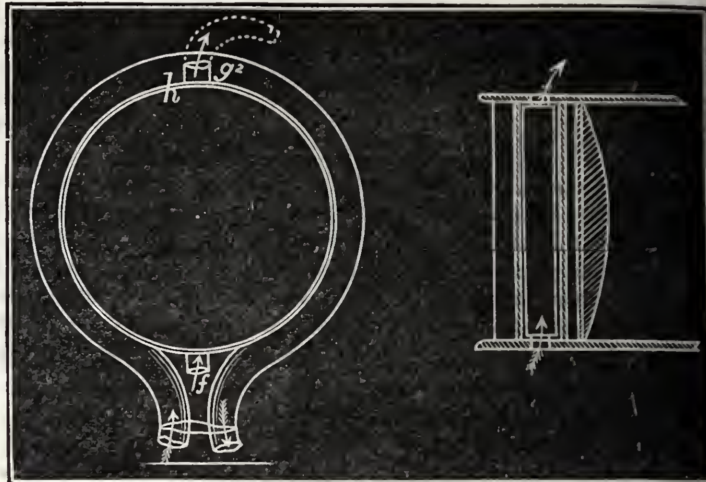
The exterior view (*fig.* 5) shows, by the arrows, the entrance and exit of the water or other liquid to the exterior of the case h. The openings, or pipes, at g^1 admit the liquid, as shown on *fig.* 4, same issuing from same at *fig.* 2.

It is to be understood that arrangements are made in each case for carrying the condensers, so as to allow of the circulatfon of cooling liquid as may be required, substantially similar to the arrangements shown in *fig.* 4.

It is also to be understood that where more than one condenser is used the water or liquid compartments thereof may be connected, as described, but be independent of each other as regards the flow.

The patentees thus conclude:—"Having now particularly described and ascertained the nature and object of the said invention, and in what manner the same is to be performed or carried out in

FIG. 5. FIG. 6



practice, we hereby declare that we claim the said invention of 'Improved arrangements or means applicable to producing enlarged pictures, and for taking pictures by the agency of light,' substantially as hereinbefore set forth and described, wherein the following are important and peculiar points or features:—

(1.) The flowing of liquid through the condenser or condensers for the purpose of keeping same cool, substantially as described.

(2.) The flowing of liquid through receptacles, troughs, or compartments, separate or in combination with the condensers, substantially as hereinbefore set forth, described, and exemplified.

(3.) The utilisation of the heat from the electric light, as a means of keeping it central with the condensers and lenses, substantially as hereinbefore described and exemplified."

We have become so accustomed to the use of "alkaline pyro." as a developer for dry plates, and it has answered all purposes so perfectly, that little if any attention has been given to the action of similar substances other than pyrogallic acid when employed in connection with alkali. The recent announcement made in our columns by Mr. M. Carey Lea, to the effect that *gallic* acid in combination with an alkali formed almost as energetic a developer as pyro. under the same conditions, caused a feeling of surprise almost amounting to incredulity. It seemed at the first blush almost impossible that gallic acid, so similar in general properties to pyrogallic, should possess qualities which have escaped detection all these years. As a developing agent in connection with silver gallic acid has, of course, been known as far back as development itself, yet we believe until Mr. Lea noticed the fact its power when mixed with an alkali was entirely unknown; certainly it had never been practically utilised. There is, however, no doubt of the truth of Mr. Lea's assertion; indeed, instead of being only "*nearly* as energetic" as pyro., we are inclined to think that in some respects it is more so. Having casually tried the experiment of substituting it for pyro. we were so struck with its behaviour that we were induced to make a series of comparative trials between the two, and though perhaps on so short an acquaintance with its action we are scarcely in a position to pronounce decidedly either for or against the new substitute, we may notice one or two points in which it differs from its older rival. Saturated solutions of gallic acid, carbonate of ammonia, and a fifteen-grain solution of bromide of potassium were used in these experiments against the usual three-grain pyro. solution. An exposed plate having been cut in two, the respective halves were treated with pyro. and gallic acid, one drop of the ammonia solution, but *no* bromide, being added to three drachms of each developer. The pyro. brought out a feeble image in a very short time, but it was not till four drops of ammonia had been added that the other produced any image at all, and then only the high lights. We then added eight more drops of ammonia, and the picture flashed out at once in all its detail and with almost printing density. After "ringing the changes" upon a number of different modes of development we arrived at the conclusion that, whereas pyro. will develope an image with the merest trace of alkali or with none at all, gallic acid requires a much larger quantity before it becomes capable of starting a satisfactory action; that as the quantity is increased so does it approach nearer to pyro. in energy, and *it will bear a very much* larger proportion than the latter. It gives great density, and the difference in its cost would render it a desirable substitute for pyro. if further experience proves it to be equally reliable.

British Association.

DUBLIN MEETING, 1878.

The forty-eighth annual meeting of the British Association for the Advancement of Science now ranks in the category of past events. In accordance with its nomadic character its meetings are held in various parts of the United Kingdom, every large city and town, with the exception of London, partaking in an occasional visit from the *savants* of whom its members and associates are composed. Last year, it will be remembered, the meeting was held in Plymouth; that which has just terminated has been held in Dublin; while next year will see the "parliament of science" assembled in Sheffield, and soforth. The meeting lasts for a week and forms a delightful *réunion* for men of science, under which designation we include the fair sex, many of whom are always present at these annual meetings.

The public proceedings began on Wednesday evening, the 14th inst., when over two thousand ladies and gentlemen assembled to listen to the President's address, delivered by Mr. William Spottiswoode, M.A., D.C.L., F.R.S., &c., who this year fills the office of President of the Association. There was nothing in the address of a character interesting to photographers as such, nor was there even an allusion to our art-science, which has too long passed the experimental stage when its marvels filled our *savants* with astonishment. From the fact that Mr. Spottiswoode has devoted so much of his time to investigations connected with the polarisation of light—upon which subject he has both written and lectured much —one would naturally have expected some special allusion to be made to that department of science. Such, however, was not the case, mathematics forming the leading theme of his discourse. Precision and exactness being taken as the characteristics which distinguish the mathematical phase of a subject, it was, he considered, natural they should be led to expect that the approach to such a phase would be indicated by the increasing application of the principle of measurement and by the importance attached to numerical results. This necessary condition for progress might, he thought, he fairly described as one of the main features of scientific advance in the present day. On this point he said:—

"If it were my purpose, by descending into the arena of special sciences, to show how the most various investigations alike tend to issue in measurement, and to that extent to assume a mathematical phase, I should be embarrassed by the abundance of instances which might be adduced. I will, therefore, confine myself to a passing notice of a very few, selecting those which exemplify not only the general tendency but also the special character of the measurements now particularly required, viz., that of minuteness, and the indirect method by which alone we can at present hope to approach them. An object having a diameter of an 80,000th of an inch is perhaps the smallest of which the microscope could give any well-defined representation; and it is improbable that one of 120,000th of an inch could be singly discerned with the highest powers at our command. But the solar beams and the electric light reveal to us the presence of bodies far smaller than these. And, in the absence of any means of observing them singly, Professor Tyndall has suggested a scale of these minute objects in terms of the lengths of luminiferous waves. To this he was led, not by any attempt at individual measurement, but by taking account of them in the aggregate, and observing the tints which they scatter laterally when clustered in the form of actinic clouds. The small bodies with which experimental science has recently come into contact are not confined to gaseous molecules, but comprise also complete organisms; and the same philosopher has made a profound study of the momentous influence exerted by these minute organisms in the economy of life. And if, in view of their specific effects, whether deleterious or other, on human life, any qualitative classification or quantitative estimate be ever possible, it seems that it must be effected by some such method as that indicated above.

"Again: to enumerate a few more instances of the measurement of minute quantities, there are the average distances of molecules from one another in various gases and at various pressures; the length of their free path, or range open for their motion without coming into collision; there are movements causing the pressures and differences of pressure under which Mr. Crookes's radiometers execute their wonderful revolutions. There are the excursions of the air while transmitting notes of high pitch, which, through the researches of Lord Rayleigh, appear to be of a diminutiveness altogether unexpected. There are the molecular actions brought into play in the remarkable experiments by Dr. Ker, who has succeeded, where even Faraday failed, in effecting a visible rotation of the plane of polarisation of light in its passage through electrified dielectrics, and on its reflexion at the surface of a magnet. To take one more instance, which must be present to the minds of us all, there are the infinitesimal ripples of the vibrating plate in Mr. Graham Bell's most marvellous invention. Of the nodes and ventral segments in the plate of the telephone, which actually converts sound into electricity and electricity into sound, we can at present form no conception. All that can now be said is that the most perfect specimens of Chladni's sand figures on a vibrating plate, or of Kundt's lycopodium heaps in a musical tube, or even Mr. Sedley Taylor's more delicate vortices in the films of the phoneidoscope, are rough and sketchy compared with these; for, notwithstanding the fact that in the movements of the telephone-plate we have actually in our hand the solution of that old world-problem, the construction of a speaking machine, yet the characters in which that solution is expressed are too small for our powers of decipherment. In movements such as these we seem to lose sight of the distinction, or perhaps we have unconsciously passed the boundary between massive and molecular motion.

"Through the phonograph we have not only a transformation but a permanent and tangible record of the mechanism of speech. But the differences upon which articulation (apart from loudness, pitch, and quality) depends appear, from the experiments of Fleeming Jenkins and others, to be of microscopic size. The microphone affords another instance of the unexpected value of minute variations—in this case of electric currents; and it is remarkable that the gist of the instrument seems to lie in obtaining and perfecting that which electricians have hitherto most scrupulously avoided, viz., loose contact."

In the Sections there were only three communications possessing photographic interest, one of these in Section A (Mathematics and Physics) being by M. Janssen, who spoke of the method by which he obtained certain solar photographs he exhibited. As at a very recent period we published an account of M. Janssen's experiments further allusion to them at present is not considered necessary. The other papers were by Captain Waterhouse, of Calcutta, and Mr. William Willis, Jun., both of which papers will be found in the present number. The former of these gentlemen contributes greatly to our knowledge of processes suitable for cartography, while the latter is to be congratulated upon having made a further improvement upon his admirable process of platinotype printing, in which the necessity, formerly experienced, for giving the paper a preliminary wash of nitrate of silver has ceased to exist.

As usual, discourses were delivered on the evenings of Friday and Monday in "Association week." That on the former evening was by Mr. G. J. Romanes, F.L.S., on *Animal Intelligence;* and on the latter evening by Professor Dewar, F.R.S., on *Dissociation, or Modern Ideas of Chemical Action.*

The following are the communications to the Sections which are likely to prove of most interest to our readers:—

Section A.—Mathematical and Physical Science.

Friday, August 16, 1878.

REPORT ON THE OSCILLATION-FREQUENCIES OF THE RAYS OF THE SOLAR SPECTRUM.

By G. J. Stoney.

The report said that so long as light was propagated through a vacuum the undulator, however complex, maintained its form unaltered at all distances from the source of light; for in vacuous spaces waves of different periods advanced at the same rate and directly forward, and therefore the simple component undulations which were represented by the several terms of a sinusoid series accurately accompanied each other throughout their whole journey. But the event was different if the light encountered an optical agent which acted differently on waves of different periods. Of this kind were the prisms and diffraction gratings of our spectroscopes. Waves of different perions were compelled to travel in different directions, and thus the several terms of the sinusoid series appeared under the form of lines in the spectrum. The wave-lengths corresponding to each position in the spectrum had been determined with great care, and these, when corrected for the dispersion of the air, were proportional to the corresponding perionic times, which thus became known. By a discussion of the observations it might be expected that much would be learned with regard to the original disturbance caused by the source of light. In the present state of science it was of importance to facilitate this inquiry as much as possible, and it was hoped that aid would be given to the student of nature by the table published in connection with the report, in which the oscillation-frequencies of the principal rays of the visible part of the solar spectrum had been computed from Angstrom's determinations of their wave-lengths in air, combined with Ketteler's observations on the dispersion of air.

SECTION B.—CHEMICAL SCIENCE.

Tuesday, August 20, 1878.

A NEW PROCESS OF PHOTO-CHEMICAL PRINTING IN METALLIC PLATINUM.

By W. WILLIS, Jun.

IT is a fact well known to chemists that metallic platinum in all its states, massive and molecular, is totally unchanged or unaltered by atmospheric influences. It is also well known that platinum in a finely-divided state has an intensely black colour. Now, if a picture be produced on paper or other suitable substance, in which the dark portions and shades are formed by this black, finely-divided metal, it is evident, so far as this metallic pigment itself is concerned, that the picture is perfectly permanent and unalterable. The object of this process is to produce pictures in which this result is obtained.

The chemical reaction upon which the platinotype process is based is one discovered by the writer some years ago. He found that a hot solution of ferrous oxalate in potassic oxalate instantly reduced platinum to the metallic state from its chlorides and other salts. Now, ferrous oxalate is produced by the action of light upon ferric oxalate. If, then, paper be coated with the latter salt and exposed to light the coating will be changed by actinic action to one of ferrous oxalate. If a photographic negative be superimposed previous to this exposure to light an image of ferrous oxalate will be produced corresponding to those more transparent parts of the negative through which the light has more readily passed.

If a salt of platinum be mixed with the ferric oxalate with which the paper is coated, and the paper be then exposed to light under a negative, the image on the paper will be composed of ferrous oxalate, the particles of which lie side by side, and are intimately mixed with those of the platinum salt. This image of ferrous oxalate is soluble in potassic oxalate, but we have previously learnt that a solution of ferrous oxalate in potassic oxalate instantly reduces platinum salts. If, therefore, this image be floated on a solution of potassic oxalate, we shall expect that at the moment it is dissolved the solution thus formed will reduce the platinum salt with which it is intimately in contact. This is what in reality occurs. The ferrous oxalate is dissolved away, leaving in its place finely-divided metallic platinum. Strange to say, this reduction takes place so instantaneously that not a particle of metal is removed from its position in the picture, but is left entangled in and amongst the matted fibres of the paper.

When working this process on a large scale, the paper on which the prints were to be made received a coating of a weak solution of a silver salt previous to its treatment with the iron and platinum salts. This silver salt in some way caused the platinum, reduced by the ferrous oxalate, to be deposited in a very finely-divided state. If the paper had no preliminary coating of silver salt the platinum was always deposited in a roughly-granular form, and did not well adhere to the paper.

Recent experiments have proved that this preliminary coating of silver salt is unnecessary, and may be altogether dispensed with, if to the bath of potassic oxalate, on which the prints are floated after exposure to light, an addition of a platinum salt be made.

The remarkably simple form the process now takes may be briefly indicated as follows:—Paper is coated with a mixture of aqueous solutions of ferric oxalate and potassic chloro-platinite, then dried, and exposed to light under a negative. After it has had a sufficient exposure it is floated on a hot aqueous solution containing potassic oxalate and a salt of platinum. This solution instantly developes the picture, which is then washed in one or two solutions to remove the chemical salts adhering to the paper. When dried the print is finished.

This printing process derives considerable interest from the fact that it is the first in which platinum in the metallic state has been made use of as a pigment, and that it is the first photo-chemical process giving permanent results of any practical value, in which the particles of pigment forming the picture are embedded in and entangled amongst the fibres of the paper on which they are printed, and do not depend for their adhesion on the use of any sizing material.

The applications to be made of this process embrace all those to which photographic printing is at present adapted. The pure black colour of the images or pictures, their absolute permanence, and the important fact that the pigment forming them penetrates the paper, render the process peculiarly adapted for the permanent reproduction of important documents, archæological records, medical, geological, botanical, and other scientific phenomena; or for illustrating the results of military, naval, and engineering operations, and for the illustrations of high-class books.

SECTION E.—GEOGRAPHY.

Friday, August 16, 1878.

ON PROCESSES OF MAP PRODUCTION BY PHOTOGRAPHY.

By Capt. J. WATERHOUSE, *Assistant Surveyor-General of India.*

ON leaving India little more than a month ago, on very short leave, I was quite uncertain whether I should be able to attend the meeting of this Association, and was quite unprepared for the honour of addressing the Geographical Section. The officers of the Section have, however, assured me that the subject which I have made a special study for several years past would be of interest, as inquiries were constantly being made regarding the various photographic processes by which maps are now being produced.

To explain so technical a subject properly, and make it interesting, the paper should have been illustrated by specimens showing the several processes in their various stages, and I greatly regret that I have come from India unprovided with these, and have been unable to supply the want in the short time I have been in England. Mr. Coles, map curator of the Royal Geographical Society, has, however, very kindly selected for me a few specimens from the collections of the Royal Geographical Society, and I trust that any shortcomings in this respect may, under the circumstances, be excused. I shall endeavour to make the working of the processes as clear as I possibly can without entering too much into technical details.

The ordinary processes for the production of maps are, as is well known, lithography and engraving, the latter being used in preference for maps of a permanent or standard character, in order to have the means of preserving the plates in a convenient form for subsequent correction and multiplication by electrotype or transfer to stone, and thus save the wear and tear of printing from the original plates.

Both engraving and lithography, however, require the entire copying by hand of any given subject, which in most cases demands a considerable expenditure of time and of skilled manual and artistic labour, and consequently these methods are comparatively slow and expensive.

The attention of cartographers was very soon drawn to the advantages that might be gained by the employment of photography for the reproduction of maps and plans; but for some time progress in this direction was hindered by the difficulty of obtaining accurate images, free from the distortions caused by imperfect construction of the photographic lenses and processes then employed.

Of late years, however, great improvements have been made in these respects, and photography has been largely utilised by cartographers in the production of maps by processes analogous to the ordinary processes of lithography and engraving, but vastly cheaper and quicker; and most civilised states now possess special photographic establishments for the reproduction of maps, plans, &c., for fiscal, military, and other purposes.

It is to the credit of our country that the first attempt to use photography practically in the reproduction of maps was made in 1855, by the late Colonel Sir Henry James, R.E., Director of the Ordnance Survey of Great Britain and Ireland, with the view of obtaining accurate reductions from the large scale surveys more expeditiously and with more economy than could be done with the pentagraph. These first attempts proved incontestably the great value of photography for the purpose and the enormous saving in time and money that would be effected by its use.

For some time, however, the use of photography at the Ordnance Survey Office was limited to obtaining accurate reduced prints for the engravers to trace from on to the copper plates; but in 1859-60 experiments made in the newly-invented carbon processes, with the object of finding a method of transferring the photographic image at once to the copper plate, led to the introduction of the process of photozincography, which has since been so largely and successfully utilised at Southampton in the reproduction of the *Doomsday Book* and other national records, and which, since its adoption in the three Presidencies of India, has rendered possible the early publication of vast numbers of maps that could not possibly have been dealt with by the ordinary methods of lithography and engraving.

By a curious coincidence it happened that at the very time the Southampton process was being perfected, Mr. Osborne, of Melbourne, Australia, introduced, quite independently, an almost identically similar process of photolithography, which has since been very successfully and largely used in the Australian colonies, Germany, and America. These two processes are worthy of special notice as being the first employed in a practical way for the reproduction and multiplication of maps for publication. They are still largely used, and possess advantages in some respects, especially for large work, over other processes of the same kind which give, perhaps, finer results within the limits of a single negative.

In India the ever-increasing wants in the way of communication by rail, road, or river, and the rapid extension of irrigation and other engineering projects, as well as the ordinary military administrative and fiscal requirements, make the early publication of the results of the surveys a matter of very great necessity and importance; and, as skilled lithographic draughtsmen and engravers are not to be found and have to be trained as required or brought from Europe at great risk and expense, the subject of photography as a means of quickly producing and publishing copies of the original maps of the surveys, is much more important there than it is in other countries where skilled cartographic lithographers and engravers are comparatively numerous.

The success of the introduction of photography into the Ordnance Survey Office at Southampton led to its early adoption in India; and in 1862 some sappers trained at Southampton were sent out to Calcutta, where a photographic office was established in connection with the Surveyor-General's Office for the reproduction of maps and plans of the Topographical and Revenue Surveys, as well as of miscellaneous maps and other subjects for the Survey and other Government departments, among which may be particularly mentioned the charts of the Marine Surveys, of which some specimens are on the table.

Photographic offices have also been established at Dehra Doon in connection with the Great Trigonometrical Survey, and at Madras and Bombay for the publication of maps of the Revenue and Settlement Surveys of those Presidencies, and other miscellaneous work. In all these offices the Southampton process is used, with various modifications required by the climate.

In India the principal publishing office for all general and standard maps of the country is the Surveyor-General's Office, Calcutta, and here the advantages of photography have been most marked. By its aid the publishing branches are able to keep pace with the progress of the surveys so closely that as a rule each season's mapping of the Topographical and some of the Revenue Surveys is reproduced and in the hands of the public before the drawing of the following season's maps has been taken in hand. An immense amount of work is thus done, both for the reproduction of the ordinary survey maps and of large numbers of miscellaneous maps and drawings for other departments, that it would have been impossible to cope with by lithography and engraving alone. As a rule, the photozincographic maps are somewhat coarse, but they answer well all practical requirements.

The following figures will give an idea of the large extent to which photography is now being used in India:—In the Surveyor-General's Office, Calcutta, during the year 1877, 3,038 sections or subjects were received for reproduction. From these 5,343 negatives and 5,398 photographic transfer prints were taken, representing about 21,000 square feet of glass and 22,000 square feet of paper respectively. Of these sections 2,725 were transferred to zinc, and 244,593 impressions were struck off. The greater part of this large out-turn was composed of maps of the Cadastral Surveys of the North-Western Provinces on the scale of sixteen inches equal one mile, and we are now arranging to turn out regularly between 4,000 and 5,000 of these maps yearly.

At Dehra Doon, a much smaller office, the out-turn in 1876-77 was 117 maps and 30 triangulation charts photographed, and 25,259 copies printed off, besides blue prints and silver prints for the use of the engravers.

At Poona 1,798 maps were photographed from 2,745 negatives, and the number of copies printed off (including copies of 79 lithographs) was 74,739. For Madras I have no returns.

Following the example of the English Ordnance Survey, photography has been introduced and largely used in various foreign countries for the reproduction and publication of the state maps.

Thus in Belgium a process of photolithography is used for reproducing the topographical maps on the scale of $\frac{1}{20000}$. In Austria a process of photographic engraving, called "*heliogravure*," has been introduced with very great success, and is applied to the practical production of maps and other subjects. In France, Germany, Italy, Portugal, and, I believe, other European States, various processes of photolithography and photo-engraving are in use, though not to a very large extent.

In America and Japan the same processes appear to be worked very successfully for Government purposes by a commercial company, of whose work some specimens are on the table.

The specific advantages to be gained by the use of photography for the reproduction of maps and plans are:—

1. Rapidity of production and multiplication, especially when employed for copying subjects containing close and intricate details. The gain varies according to the amount of detail and the time that would be taken by a skilled draughtsman or engraver to make the copy by hand. For instance: a highly-finished map that would take several months to lithograph or engrave may, by the aid of photography, be copied and some hundreds of copies printed off in the course of a few days. This advantage is of the greatest importance in time of war or when copies of maps are very urgently required for any specific purpose. As an instance I may mention that when the occupation of Cyprus was decided upon and maps of the island were required for the use of the Government, it was found that only one copy of a map was to be obtained in London. This copy was at once sent to the Ordnance Survey Office at Southampton to be photozincographed, and thus in the course of a few hours hundreds of copies of the map were available. In India also photozincography has served us most usefully in enabling us to reproduce maps of the theatres of war in the Franco-German and Russo-Turkish campaigns immediately on the outbreak of hostilities, and before such maps could be received from Europe.

2. The perfect fidelity with which the most delicately-minute and intricate details are copied. The most skilful and careful draughtsman is liable to make errors in copying, and never can obtain the same accuracy of delineation, especially of minute objects, as is obtained with the camera.

3. The facility with which copies may be obtained on scales larger or smaller than the original. The extent to which this may be taken advantage of depends very much upon the object in view as well as upon the style of the original, and the relative thickness and size of the lines and details composing it; but, notwithstanding certain drawbacks and inconveniences it may sometimes be attended with, this facility of enlarging or reducing the scale of an original drawing, with the most perfect accuracy and with the absence of all personal error, is one of the most important advantages of photography, and its immense superiority in this respect over the pentagraph and other methods of copying by hand has been proved to be beyond question.

4. The comparative cheapness of the photographic methods. The relative cost of hand labour and photography is affected by several considerations, *e.g.*, the nature of the subject, the process employed, the number of copies made, and the pay of the photographers as compared with that of draughtsmen. In most cases it will be found that when it is really an advantage to employ photography in reproducing maps for any particular purpose the cost will be far less than it would be by employing hand labour.

Notwithstanding these advantages, the use of photography as a means of reproducing maps and plans for publication has not extended so much as might have been expected, partly on account of defects inherent in photographic copying, and only to be overcome by great skill and long experience on the part of the photographer, and partly owing to the difficulty of making draughtsmen fully understand the requirements to be fulfilled when preparing maps to be reproduced by photography for publication in order to produce satisfactory results, and that they must strictly refrain from using colour, drawing the map neatly in black and white, so that every line may be reproduced of its proper strength, according as the map is to be copied on the same scale as the original or to be reduced.

It matters little how roughly drawn or highly coloured an original drawing or map may be if it be intended to lithograph or engrave it, because a skilled lithographer or engraver can easily put it into proper and conventional form; but when such a drawing is handed to the photographer he can only produce a *facsimile* of it with all its deficiencies—the coloured details hidden under a black mass of shade, the finer parts perhaps wanting altogether, the writing rough and broken, or so small as to be almost invisible, besides other defects caused by the unsuitableness of the drawing for reproduction by photography, and these defects are liable to be unduly attributed to the process.

The photographic processes applicable to the reproduction of maps are:—

I.—*Photographic Printing on Sensitive Papers.*—In these methods prints are obtained on a sensitive surface of paper prepared with the salts of silver, platinum, and iron, or with certain salts of chromium in conjunction with pigmented gelatine. In all of them the whole of the photographic operations connected with the printing have to be repeated for every impression.

II.—*Photolithography* or *Photozincography*, or the methods by which a photographic image in greasy ink may be produced on, or transferred to, a lithographic stone or zinc plate and printed off in the lithographic press.—The photographic operations cease with the production of the image in greasy ink, and the impressions are produced by the ordinary operations of lithographic printing. The use of these processes is, however, limited to the reproduction of subjects in line or dot, as they can only reproduce half-tones in a very imperfect manner.

III.—*Photocollotype*, or the method of producing a photographic image on a layer of gelatine applied on a suitable support, so that when the gelatine surface is moistened impressions may be obtained from it in printing ink.—By this method, also, a photographic image once produced on the printing surface of gelatine is capable of yielding some hundreds of impressions in the printing press; and, instead of the subjects for reproduction being confined to those in dot or line, as in photozincography, any subject can be copied which is capable of giving a good photograph by the ordinary process of silver printing.

IV.—*Woodburytype*, or the method whereby a photographic image is impressed into a soft metal plate, somewhat in the same manner as in the operation of nature-printing, forming a mould into which liquid coloured gelatine is poured and attached under pressure to a sheet of paper, thus yielding an image in which the lights and shades of the picture are formed by different thicknesses of coloured gelatine.

V.—*Heliography* or *Photo-engraving*, the method of obtaining on a metal plate a photographic image in intaglio capable of giving impressions in the copper-plate press.—In this method the engraved plate once obtained serves for the impression of a large number of copies, and may be indefinitely multiplied by electrotyping.

VI.—*Phototypography*, or the method of obtaining by means of photography an image in relief on a metal plate, which may be mounted on a block to be set up with type and be printed in the ordinary printing press.—These blocks may also be indefinitely multiplied by electrotyping in the same manner as ordinary woodcuts.

It will be observed that the five last-named processes all possess the great advantage that, once the photographic image has been obtained on the printing surface, the operations of printing can be accomplished by the same means and at the same rate as by the ordinary industrial methods. The printing may be performed by night or by day, quite independently of the agency of light, and requires no further chemical manipulations.

It would be beyond the scope of this paper to enter fully into the practical details of these various processes of photographic printing, as my object is merely to review those applicable to cartographic purposes, and to give a summary of the principal methods that may be usefully employed with reference to the wants of the State or of private individuals rather than those of professional cartographers and map-publishers, though the latter may, in many cases, also find photography a useful auxiliary. Photographic methods can never entirely take the place of lithography or engraving by hand, either for public or private purposes, but their use may be advantageously extended. Those who wish for fuller details may consult the text-books by Abney, M. Carey Lea, Monekhoven, Vogel, and others, and the special works referred to in this paper.

Preparation of the Original Drawing.

I have already adverted to the difficulty that has been found in this country and elsewhere in obtaining original drawings suitable for reproduction by photozincography, and to the fact that without a proper original drawing it is quite impossible to produce satisfactory results. Besides its principal use in reproducing maps of the surveys, photozincography is very largely utilised in India by engineers for the reproduction of their plans and drawings, and by other public officers for an immense variety of miscellaneous maps and plans; and, as we were constantly asked to photozincograph subjects utterly unsuitable to the process, a set of rules for the preparation of the original drawings for reproduction by photozincography was drawn up under General Thuillier's direction and published in the official gazettes all over India, and the result has been a great improvement in the execution of the drawings we receive for reproduction.

The rules are as follow:—

1. All drawings should be on white, smooth-surfaced paper, free from dirt, pencil marks, creases, and wrinkles. When possible they should remain stretched on the drawing-board.

2. The Indian ink should be freshly rubbed down and give good *black* lines, free from glaze.

3. The lines should be firm and cleanly drawn—not too fine or too close together. They must be quite *black*, and light effects must be produced by fine and open black lines, and never by the use of *pale* ink. Thick lines in the printing and borders of maps should be well filled in. Pencil marks should be carefully removed, so as not to injure the blackness and firmness of the lines.

4. All cross-hatching and shading should be as open and clear as possible, and the lines composing it firm and not too fine. Intensity of shade must be shown rather by an increase in the thickness of the lines than by placing them closer together, in order that the intermediate spaces may not become blocked up when transferred to zinc. It is better not to rule the shading of mechanical and architectural section drawings, but to show the shaded parts by a light tint of blue, violet, or *aniline* red (fuschine or roseine). These parts will reproduce white, and can have a ruled tint transferred on the stone or zinc in the usual way, which will give a much neater appearance.

5. In plans or drawings intended for photozincography *washes* of any colour, except very pale blue, violet, or aniline red, are absolutely inadmissible. Outlines may, however, be drawn, if necessary, in any strong red, brown, yellow, orange, or green pigment which will reproduce black. Any details required to be shown in the original, but not in the copy, may be drawn in pale blue, violet, or aniline red. Details that are not required to be reproduced may be painted out with Chinese white.

6. River-courses, lakes, and tanks should be left blank, and not filled in with fine lines. They may be indicated by a pale wash of *blue* without detriment to their reproduction.

7. When drawings are to be reduced care must be taken to draw the lines, lettering, and detail of sufficient thickness and size relatively to the scale of reduction, so that they may not be lost or illegible when reduced. Sufficient space must also be left between the lines to prevent subsequent blocking up.

8. When possible drawings should be made on a larger scale than they are required to be copied. Photographic reductions are always sharper and firmer than reproductions to the same scale, and defects in drawing are lessened by reduction.

9. Where plans or drawings to scale are to be reduced, the scale should be given in terms of a single unit of measurement and not as relative to any second unit. Thus, the scale on a map drawn on the scale of four miles to an inch for reduction to sixteen miles to an inch should be shown simply as a "scale of miles."

10. As photography produces a more or less perfect *facsimile* of the original drawing, it is essential that drawings intended for publication should be complete and finished in every respect before they are made over to the photographer. The drawing, printing of names, &c., should be in as neat a style as possible, and not require to be altered or touched up. The hair strokes of the printing should not be too fine.

The foregoing rules may be summed up in a few words:—*White paper, black ink,* and *firm open drawing*; and, as success in the after processes depends entirely upon the perfection of the original drawing and its capability of giving a negative on which the ground is perfectly opaque while the lines are quite clear and as transparent as the bare glass, these essentials must be most carefully observed. Their neglect will entail failure and disappointment.

For drawings intended for reproduction by the collotype methods these rules are equally applicable, especially No. 7, and there is even more necessity for perfect cleanliness of the paper and neatness and finish of the drawing, because the faintest tints will be reproduced by the gelatine printing surface, and corrections cannot be made on it, as they can on zinc, stone, or copper. For this reason, also, the greatest care must be taken to complete the drawing in every respect before it is given to be reproduced. Drawings in line may be finer and more delicate than for photolithography, but still must not be so fine as to interfere with the obtaining of a perfectly-dense and opaque negative, otherwise the ground of the print will appear dirty and stained. Pale ink may be used when necessary for effect, but not more than is really requisite. Colour may be used to any extent, having always due regard to the photographic effect when reproduced. On account of the difficulty of photographing certain colours, so as to produce the same effect as in the original picture, the best results will be produced from drawings specially prepared in monochrome, such as Indian ink or sepia.

In the case of drawings for any special purpose, or not intended for publication, the above rules may be relaxed; but the general principles laid down should be observed, as far as practicable, if the best results are desired.

When drawings are prepared specially for photographic reproduction there need be no difficulty in taking all the precautions necessary for producing good results. It often happens, however, that the photographer is called upon to reproduce drawings, lithographs, or old MSS., printed records, or engravings, which either may never have been suitable for the purpose or, if suitable when fresh, have become dirty and stained by age. Herr Scamoni, the skilful Chief of the Photographic Department of the Imperial State-Paper Office at St. Petersburg, has given some useful hints on the treatment of such subjects under these circumstances*:—

"Yellow or otherwise objectionable spots should be carefully covered over in the spaces between the lines with Chinese white, and, whenever possible, the lines should be strengthened in parts where they appear weak.

"Lithographs and engravings may be bleached by immersion in a solution of chloride of lime or *Eau de javelle* (one to ten or fifteen of water), then soaked in water for some hours, after which they are treated with a weak solution of hyposulphite of soda, and finally well rinsed in clean water.

"Fresh grease stains may be removed with chloroform, benzine, and ether, or with a weak alkaline solution of caustic potash or its carbonate.

"Old grease stains may be removed with a more or less strong solution of potash, applied at the back of the subject.

"Iron mould and ink spots may be taken out with a solution of oxalic acid or salts of sorrel."

When tracings are made on paper or vellum cloth to be reproduced without the aid of the camera special care must be taken to keep the back of the drawing clean, and to choose paper or cloth free from stains and of as even a texture as possible.

Originals drawn on rough paper may be smoothed in a copperplate press, and, if dirty, should be carefully cleaned with india-rubber or bread.

(To be continued.)

SOIREES, EXCURSIONS, &c.

In addition to the two *soirées* usually held by the British Association there were numerous excursions to scenes of interest in the neighbourhood of Dublin. Several of these parties were accompanied by local photographers, who secured groups of the members of whom they were composed. Among those photographers who were thus successful were Mr. Laurence, Mr. Lesage, Mr. Robinson, &c. Other followers of the "craft" appeared to be busily engaged during the week in obtaining single "counterfeit presentments" of the members, among whom we may mention the names of Mr. Chancellor, of Sackville-street, and Messrs. A. and G. Taylor, of Stephen's Green.

His Excellency, the Lord Lieutenant of Ireland, with her Grace the Duchess of Marlborough and suite, were indefatigable in their endeavours to do honour to the members of the Association, being present both at the meetings of the sections and at the *soirées*, On Monday afternoon his Excellency visited Mr. Howard Grubb's astronomical works. It will be remembered that at these works were constructed the great Melbourne telescope and the several great equatorials lately erected in England for the Royal Society, Lord Lindsay, Oxford, &c., and Mr. Grubb has now in construction the largest refractor ever attempted. This instrument is twenty-seven inches clear aperture, and will be erected, when complete, at the New Imperial Observatory in Vienna, which institution Mr.

* *Handbuch der Heliographie*, p. 67.

Grubb is also fitting up with all its domes and machinery. Three great domes, as large as that in the Greenwich Observatory, have already been despatched, and the great steel dome, forty-five feet in diameter, which is to cap the great equatorial room in Vienna, is now complete and ready for despatching. This is the largest observatory roof in the world, and, when we mention that it is necessary that this ponderous roof of fifteen tons' weight can be moved round and manipulated with one hand, the nature and difficulties of the work may be appreciated. A few years since almost all astronomical instruments were obtained from Germany; but the last few years have witnessed the creation of an astronomical manufactory in Dublin, employing exclusively Irish workmen, competing successfully against foreign manufacture, not only in our own country, but even in that which previously supplied all such instruments to the world. During the last few years more than £15,000 worth of astronomical instruments have been manufactured for Germany alone.

Many other members availed themselves of Mr. Grubb's kindness in throwing his extensive optical works open for their inspection.

His Excellency the Lord Lieutenant and the Duchess gave a charming garden party at the Vice-Regal Lodge, Phœnix Park, on the afternoon of Thursday, the 15th inst., which was attended by a distinguished assemblage of visitors, but the pleasure of the outdoor amusements was slightly marred by the capriciousness of the weather.

We may incidently mention that at a special meeting of the Senatus of Trinity College—in one or other of the halls or lecture rooms connected with which all the ordinary meetings of the Association were held—the degree of LL.D. was conferred upon the President and several of the more eminent members of the British Association.

At the concluding meeting, held on Wednesday last, it was decided that the next meeting of the Association should be held at Sheffield on the 6th August, 1879, under the presidency of Dr. J. Allman, F.R.S.

INDOOR PHOTOGRAPHY.

Since I wrote a few weeks ago on the subject of amateur portraiture I have discussed the subject with several amateurs who have at some time or other essayed the production of portraits in an ordinary room, but with apparently very poor success, the chief difficulties complained of being the necessity for an inordinately long exposure, or, where this was not the case, the production of too strong contrasts in the lighting. Of course, without a knowledge of the precise conditions observed in each individual case it is impossible to say what may have been the cause of these failures, but I propose to give a few further hints which my own experience leads me to believe may possibly explain the want of success.

It may seem a mere truism to suggest that the complaint of excessive exposure arises in many cases from the employment of too slow a plate, especially if it be an emulsion one. I should, perhaps, express my meaning more clearly by saying an *unsuitable* plate; for it is well known that many emulsions which, in a good light or in open landscape, work almost as quickly as an average wet plate fall far short of the latter when the quality of the light is lowered. Others, on the contrary, compare favourably with the wet plate in their power of rendering feebly-lighted subjects. It is in losing sight of this discrepancy in the sensitiveness of the plates under different conditions that I believe much of the want of success lies. I have myself, at the present time, two samples of emulsion which for outdoor work scarcely differ in rapidity, but when applied to portraiture indoors the difference is nearly three to one.

But the same complaint of lengthy exposure comes also from one who has invariably employed wet plates in his attempts at portraiture, so that the cause, evidently, in his instance amounts to one of deficiency of illumination. This may easily be the case without necessarily being the true explanation, or without proving a defect in the system of lighting that I advocate. On inquiring particulars as to the position of the sitter and distance from the light, I found that my friend had been in the habit of placing his sitters "well back—eight or nine feet from the window," under which circumstances it is scarcely surprising that a long exposure should be necessary. Even upon the ground glass the rapid falling off in the quality of the illumination, as the sitter is removed to only a slightly greater distance from the window, cannot fail to be noticed; and though at the distance named an apparently well-lighted picture is seen on the focussing-screen its actual actinic value is very small.

Speaking theoretically, the illumination diminishes in proportion to the square of the distance from the light; hence if at a distance of three feet from the window an exposure of fifteen seconds be sufficient, at nine feet two minutes and a-quarter would be necessary to produce a like result. To place the matter in terms which any photographer will understand, the difference is, in fact, the same as would occur by reducing the diameter of the stop to one-third. It cannot be too clearly borne in mind that the sitter should be placed as close to the window as circumstances permit, unless for the sake of obtaining some particular effect rapidity is sacrificed to a slight extent. In proportion as the distance from the light is increased so is the contrast between the illumined and the shadow sides of the face lessened; and thus, if we have too harsh a shadow which cannot conveniently be modified by means of the reflector, we can, by removing the sitter to a greater distance from the window and increasing the exposure proportionately, produce a more harmonious result.

The size of the window will, of course, by admitting more or less light, govern the distance to which the sitter may be moved without practical inconvenience; and the greater its height from the ground the further will the light penetrate into the room, unless cut off by local objects. An extension of the lateral dimensions admits more oblique rays, which act upon the shaded side of the figure, and soften the contrast.

Where the fault consists in the production of too heavy shadows, in nine cases out of ten the cause may be traced to under-exposure. I am assuming, of course, that proper precautions are taken in posing the sitter and in arranging the reflector. The peculiarity of bromide plates is that with a short exposure they are capable of rendering a vast amount of delicate detail, which, however, is of no practical value, as it is impossible to intensify. This is bad enough in a landscape, but when applied to the "human face divine" the result is infinitely worse. But, in addition to the under-exposure, in attempting to push density into the half-tints the well-lighted portions of the face are overdone, and the result is veritable "soot and whitewash." If a slow, or what I have termed unsuitable, emulsion be used these defects will be doubly or trebly augmented, and, indeed, unless an extremely protracted exposure be given, will be insurmountable.

The harshness may, however, arise from bad lighting, and here actual experiment is the only means of getting over the trouble. It is all very well to say, as has been said, that portraits produced in an ordinary room are more pleasing and natural than those taken in the studio because they represent our friends as we are in the habit of seeing them; but, unfortunately, in adopting this opinion, the conclusion is arrived at that nothing is wanted but "the right exposure" to produce an unmistakable *chef d'œuvre*. Nothing could be further from the truth. The simple fact is that we are attempting, under difficulties, to attain the same end which the professional photographer seeks with all the assistance that art and skill can supply, viz., to make up the deficiencies of the too matter-of-fact camera. Indoor portraiture removes many of the difficulties which are experienced in working out of doors, and many effects may be obtained which would be quite out of the question under the latter circumstances; but it is ridiculous to suppose that an ordinary room can enter into competition on level terms with a studio expensively fitted up for the special purpose.

For amateurs, however, the subject is worth studying, as it affords them the opportunity of producing very good results in a branch of photography in which hitherto, as a rule, they have not shown to advantage. But, like most other things, there is a little trouble connected with it; if it were not so, the game would scarcely be worth the candle.

W. B. Bolton.

PHOTOGRAPHY UPON CANVAS PREPARED FOR OIL PAINTING.

In producing a photographic print intended to serve as an outline for a portrait to be finished in oil colours upon ordinary prepared canvas, coatings of collodion, gelatine, albumen, &c., should be avoided, because the colours should combine directly with the grounding of the prepared canvas so that afterwards the film of colour when dry may neither spring up nor show rents.

The simplest way of reaching the desired end is to make the canvas itself the permanent support of the sensitive chemical compound; in a word, to salt and silver it as in the paper process. But as the properties of canvas cause it to require a different treatment from that adapted to paper, the following remarks, supplied by Herr Lüttgens, formerly a painter and photographer in Hamburg, may be useful:—

"The canvas should first be stretched on a frame of laths, and cleaned from all dust or dirt. This is done by pouring strong spirit upon the linen, laid horizontally, until its surface is covered, and rubbing with a clean cloth until all the spirit has evaporated. If the ground contain much oil this operation must be repeated.

"The treatment with spirit renders the canvas better suited to take on the salting solution, which consists of a filtered solution of twenty grammes of bicarbonate of soda in 300 grammes of water. The purpose of the bicarbonate of soda is to cause a slight frothing up of the oil contained in the prepared canvas, so as to make it usable with water. The above-mentioned solution must be poured quickly and equally over the surface of the canvas. The latter should then be turned round and round slowly until it appears equally damp and not streaky. The frame upon which it is stretched is then set up to dry spontaneously, but neither in the sun nor in the neighbourhood of an oven.

"As soon as the canvas is dry pour over it a solution of one gramme of common salt in 200 grammes of distilled water, or, if a bluish tone be required, use sal ammonia instead of the common salt. When this solution has remained four or five minutes on the canvas let it run off, and dry as before. The canvas is silvered in the dark room by pouring over it a solution of one gramme of nitrate of silver in thirty grammes distilled water, no larger a surface being covered than it is intended to print upon. In two minutes pour off the silver, and dry in the dark room.

"In printing one may use either a direct negative or an enlargement from a transparency. The negative may be fastened sufficiently tightly down upon the canvas by a broad band (girth bands) passing over the top and another over the bottom edge of the negative. If the edges do not project far enough they may be eked out by pasting on strips of pasteboard. As the lights must remain clear and white it is recommended to print lightly in the direct sunlight. Fix by letting a weak solution of hyposulphite of soda act on the picture from twenty to thirty seconds.

"Rinse, and then wash the pictures with water every 100 cubic centimetres of which contain two drops of sulphuric acid; then wash well with pure water. When dry the picture is ready for the painter's brush. If the picture should not appear distinctly enough coat it with oil and turpentine. Every disturbance of the prepared surface should be avoided, and from the first operation onwards care should be taken not to wet the back of the picture. Then, as there are various qualities of linen in the market, the first treatment with alcohol and bicarbonate of soda will sometimes require to be frequently repeated, as some sorts of canvas refuse to take on the watery solution, or will not take it on equally. If the picture should not be successful damp it with water, and remove it with a weak solution of cyanide of potassium in water, rubbing it on with a soft rag until every trace of the image has disappeared. Then wash well with clean water, and begin again at the beginning, the only difference being that the bicarbonate solution should not be so strong as at first.

"For direct enlargements upon prepared linen made by means of the sciopticon it is recommended that a solution of bromide of potassium be used for salting instead of the common salt. The silvering should then be done as already described, the excess of nitrate of silver washed off, and the surface coated with Wilde's preservative fluid.*

"When dry the enlargement from the negative should be projected upon the canvas by the lantern, and an alkaline developer used to develope the image. The other operations remain the same as those already described."

The editor of the *Wochenblatt* has not tested this method experimentally, but thinks it looks well on paper.
—*Photographisches Wochenblatt.*

THE APPLICATION OF PHOTOGRAPHY TO THE PRODUCTION OF PRINTING SURFACES AND PICTURES IN PIGMENT.

IN SIX LECTURES.

V.—COLLOTYPIC PRINTING.

[A communication to the Society of Arts.]

You have already seen how extended is the use of bichromated gelatine in photo-mechanical printing processes, and we now have to study a method in which the gelatine itself is used as a printing surface.

The bare principles of collotypic printing are as follow:—A plate of glass or metal is coated with a uniform layer of bichromated gelatine, and this is exposed to light under a negative. Certain parts become insoluble by the action of light; others remain soluble and capable of absorbing water. The plate is damped, and a roller charged with fatty ink is passed over it. Those parts which received the water refuse the ink; and a piece of paper being laid on and pressure applied the ink sets off on the paper, forming a print. But more than this is true, as we have an infinite number of grades between the two extremes of water-taking parts and of ink-taking parts, those parts which had a slight exposure to light being capable of receiving both ink and water—the proportion in which each is received depending on the extent to which the part has been acted on by light. Here is a damp collotype plate. I hold it up to the light, and those who are near can see a very feeble image. I now pass the inking roller over it a few times, and the fatty ink adheres to those parts which have been exposed to light, the amount of ink being proportionate to the extent to which the light has acted, so that a picture is built up with all its gradations of light and shade. I hold up the inked plate before the light, and you see the image distinctly. I will now hand round the inked plate, together with a similar, but uninked, plate. Here is one more plate, which I take from this dish of water; this I will ink, and take an impression from it on paper. Here they are, you see. If you hand them round you can compare the plate with the proof printed from it.

The first step in preparing the collotypic plate is to take two pieces of plate glass, such as I have here, to put some water and flour emery on one of them, and then to grind them together until the rubbing surfaces are uniformly de-polished. It is not worth while for me to go on grinding these until they are finished, but here are some finished ones which you can examine. When the plates have been sufficiently ground they must be well rinsed and reared up against a shelf to dry. The next thing is to prepare a mixture of seven parts of albumen, three parts of commercial water-glass solution, and ten parts of water. This mixture being made, it is churned to a froth by one of these American egg-beaters. You see it only takes about two minutes to convert the whole into a froth. I now pour this froth on a paper filter, and as it breaks up it runs through. This solution is now ready to pour on the plates, and you see that it runs easily over. I now let it drain off at one corner, and allow the plate to dry in an inclined position. When dry the plate is well rinsed in water in order to remove all soluble matter, and is again reared up to dry. In this state the plate is covered with an extremely thin, whitish film, which causes adhesion between the plate and the gelatine coating which is next applied. The sensitive gelatinous mixture is prepared by dissolving six parts of gelatine in forty-eight parts of water, and adding one part of ammonium bichromate and forty-eight parts of alcohol. The mixture is then strained through fine muslin and is ready for use.

Here is a metal hot plate, made double, and in the interspace water is kept boiling. Three levelling screws support one of the prepared glass plates, about an inch from the surface of the metal hot plate. The glass plate usually reaches a temperature of about 50° C. under these circumstances, and when this is the case, and the plate is quite level, all is ready for coating it with the sensitive gelatine. I now pour on the middle of the plate as much of the sensitive mixture as it will conveniently hold, and you see that it runs well over the plate, even up to the corners. I now lift up the plate quickly, drain off the excess of gelatinous mixture, give the plate a rocking motion, and put it back on the levelling screws in its old position. In about ten minutes it will be dry and ready for exposure in the printing-frame, and this exposure is about equal to that which would be required to make a silver print from the same negative; but a plate which has been dried quickly requires a longer exposure than one which has been dried slowly.

Mr. Debus is now holding a dried plate against the lime light, and you merely see an even yellow tint, arising from the uniform film of bichromated gelatine. He will now hold up a similar plate which has been exposed under a negative, and you see a faint brownish image, showing all details and shades of the original. After having printed the plate under the negative the next step is to soak the plate in cold water in order to remove the free bichromate; and during this soaking the image becomes much fainter, as you will see when I hold this soaked plate before the lime light. During this soaking in water another change, and a remarkable one, takes place; all the exposed parts of the plate become puckered up into a multitude of little folds, which wind about in a very peculiar manner. These folds may be traced almost all over the picture, their depth being greatest on those parts which have been most exposed—at least up to a certain limit, beyond which increased exposure tends to destroy the folds. The pitch of these folds may vary from about fifty to three hundred to a linear

* 1. Dissolve in 1,000 c.c. of distilled water ten grammes of tannin and ten grammes of gelatine cut into very fine strips. After a few days, during which time it should often be shaken, filter off the tannin solution from the gelatine.—2. To 500 c.c. of absolute alcohol add five grammes of salicine; make moderately warm, and shake diligently. Into the filtrate of No. 1 filter 100 c.c. of No. 2. Then add two drops of a solution of five grammes of red coralline in forty c.c. of alcohol, or eosine one gramme, water three c.c., alcohol five c.c. This preservative solution, into which the plate may be dipped, may be used over and over again, but it should be protected from the light.

inch, and this pitch varies according to the treatment of the plate, the kind of gelatine used, the condition of the bichromate, the length of time which the sensitive mixture is kept before use, the rapidity of drying, and other circumstances. This puckering, reticulation, or grain has much to do with the printing qualities of the plate, one with a coarse grain being easier to print from than one with a fine grain, but the results are, in general, not so good. When the plate has been soaked in water sufficiently long to remove the excess of bichromate and to develope the grain it is taken out and allowed to drp spontaneously. The dry plate may then be kept without injury for several days, weeks, or even months. It should be kept in a dry, cool room, and, as a rule, ought not to be put away in a brightly-lighted place.

We now pass on to the inking of the plate and its treatment in the press. Before use the plate should be soaked in water, in order to saturate the soluble portions of the gelatine with this fluid, and generally five or ten minutes is sufficient for this purpose. It is usual to employ the ordinary lithographic roller and ordinary lithographic inks for collotypic printing, and when a lithographic roller is in really first-rate condition it answers admirably; but a new lithographic roller can only be got into a sufficiently good condition by daily exercise for about a month, and the least carelessness, the drying of ink on it, or a cessation of work for a few days, will degrade it from the state of a roller suitable for collotypic work to that of an ordinary roller suitable for lithography.

Here is a form of roller which I have devised, and have found to answer admirably, as it is always ready for use. It consists of an outer cylinder of red india-rubber, made smooth on the outside by means of fine glass paper; inside this is a thickness of about three-quarters of an inch of ordinary typographic roller composition (glue and treacle), and inside all a wooden core, provided with handles. To make this kind of roller I put the india-rubber cylinder inside this brass mould, place the core in position, and pour in a little of this glue-and-treacle composition—just enough to seal the joint at the bottom—and when this has set I will fill the space with the glue-and-treacle mixture. When a roller of this kind is done with the ink can be cleaned off by means of a rag moistened with a little oil of turpentine, care being taken not to use too much. The roller is then ready to be put away, and can be brought into use again at a moment's notice.

The labour of mixing stiff inks and colours, and of getting an even film on the inking slab, is considerable; but I have found that the following plan obviates all difficulty on this score:—The ink is mixed up with oil of turpentine to the consistency of cream, and the colour may be modified by the addition of the artists' oil colours which are sold in tubes. In this way a thorough mixing of the colours is ensured, and, when it is intended to use a portion, a piece of muslin is tied over the mouth of the bottle containing the colour; the bottle is then inverted, and the muslin-covered neck is rubbed over the inking slab. The ink thus filtered out is spread evenly by means of an ordinary typographic ink roller, and is then allowed to remain a few minutes in order that the turpentine may evaporate. Thus is obtained a layer of ink free from lumps, well mixed, and evenly spread. The collotypic plate, being now taken from the water, is laid on the bed of the press, this having been previously covered with a sheet of white paper, and is gently wiped with a soft piece of muslin. The inking roller, being charged with ink from the slab, is gently rolled backwards and forwards, as I am now rolling, it being borne in mind that a slow rolling with heavy pressure tends to put much ink on the plate, and quick rolling with light pressure tends to take off an excess of ink. It is advisable to be provided with two inks, one rather thinner than the other, as the half-tones sometimes require a thin ink to bring them fairly out. To make this thin ink a little of the very fluid lithographic varnish (known as tint varnish or S.H. varnish) is added to the mixture of turpentine and ink. The kind of press best adapted for collotypic printing is the roller lithographic press, like those commonly used in France and Italy—a Waterlow's autographic press is very well adapted for the work—but the scraper press does not answer so well. You see that the press I am using consists merely of two rollers, with the tympan and bed riding between them.

The plate having been inked, and the paper laid on, a moist sponge is passed over the back of it. I then put on a few thicknesses of blotting-paper and a sheet of india-rubber an eighth of an inch thick, shut down the tympan, and pass through the press. Here, then, is the result.

Any kind of paper may be used for collotypic printing, but if it be desired to imitate silver prints a thin and rather soft enamel paper must be used, and the prints must be varnished with a varnish prepared by dissolving two parts of white shellac and one part of mastic in a convenient quantity of methylated spirit. The strength of the solution will depend on the effect required, and it is scarcely necessary to say that the varnish must not be allowed to chill. Here is a print; I will varnish one half of it, and when dry you can compare the two sides.

The process which I have demonstrated to you is practically that of Professor Husnik, as set forth in his invaluable work on the subject,* and if I were to give you the leading features of the various collotypic processes I should occupy several hours in doing it. The characteristic feature of the Albertype process consists in covering the glass plate with a film composed of gelatine, albumen, and potassium bichromate, and exposing this to light through the plate of glass, so as to make that part in immediate contact with the glass insoluble, washing off the soluble portion in warm water, so as to leave a very thin film of insoluble gelatine, capable of serving as a bond between the glass and the actual printing film, which is now applied.

Mr. J. R. Sawyer, of the Autotype Company, has elaborated a process by which he has produced magnificent results, some of which you may see hanging up all round the room. You will see among these representatives of almost all classes of photographic work—ancient manuscripts, coins, architecture, landscapes, engineering works, and book illustrations. Directly opposite to me is an exceedingly fine collotypic print of Norwich Cathedral, and this is from one of Mr. Sawyer's own negatives. You will also notice a series of prints representing the great public engineering works of France, which are now being printed by the Autotype Company under the direction of Mr. Sawyer. The production of this series, regularly and in large numbers, proves the thorough practicability of the collotype process when in careful hands.

You see before you some admirable specimens of collotypic printing by MM. Braun, of Dornach, Herren Strumper and Co., of Hamburg, and Messrs. Wright and Co., of London.

The next great step in collotypic printing is the application of steam machinery to the process; the difficulties of wiping the plate, inking, and taking off the paper by machinery are considerable, but these difficulties are being gradually overcome.

Thomas Bolas, F.C.S.

Correspondence.

"A NEW METHOD OF MAKING GLASS STEREOSCOPIC TRANSPARENCIES."

To the Editors.

Gentlemen,—I have read the paper on *A New Method of Making Glass Stereoscopic Transparencies* more than once with care, and, although I am ever ready to hail with delight any effort to popularise the stereoscope, I must confess I fail to see any great advantage, but, on the contrary, very many disadvantages, in the method proposed.

A more lengthy communication on the subject is quite at your service if you wish; but for the present I must content myself with this expression of feeling. At the same time I should like to add that I have every kind regard for Mr. William Brooks, and for my own part thank him for the time and trouble spent in perfecting his plan and making it public. He is unquestionably right in the main, and stereoscopic transparencies can and will in due time be produced rapidly and well at a reasonable rate—transparencies in every way equal to those by the late Mr. Breese, to whom be all honour for leading the way.

I sincerely trust, now the subject is once more *sur le tapis*, it will be thoroughly ventilated by all concerned, and especially let the manufacturers come forward with their opinions. They have had very little to say in the matter hitherto publicly, but have been content to keep up a quiet grumble to themselves ever since the first rage for stereoscopic slides died out; but let them take heart, for "there's a good time coming" for stereoscopic work yet, and I think I may venture to prophecy that a good stereoscopic transparency (not necessarily on glass) will eventually be sold to an appreciative public at a shilling, and that the manufacturers will not be able to turn them out fast enough to supply the demand.

I owe to the Manchester Photographic Society a second paper on *Combination Printing for the Stereoscope*, one word of which is not written as yet, I regret to say; but I hope, nevertheless, to have it ready during the early part of the next session.—I am, yours, &c.,

16, *Silverwell-street, Bolton*, S. H. Ashley Oakes.
August 20, 1878.

"HONOUR TO WHOM HONOUR IS DUE."

To the Editors.

Gentlemen,—Is there not a deep-seated animus between you and the editor of your contemporary? Readers of both journals well remember

* *Das Gesammtgebiet des Lichtdrucks.* J. Husnik. 3 Mark. Hartleben, Leipzig.

the manner in which you held up to ridicule the pretensions of that contemporary with regard to the collodio-chloride discovery; and I see from his issue of August 9 that you have again been attempting to deprive that gentleman of the honour of being the first discoverer of the liability of transfer-paper to turn yellow, this having, as he alleges, been done as far back as April of this year.

How come you to claim the honour for a denizen of the Scottish capital when you ought to have known that, at the best, all that can be claimed is but a re-discovery in this matter? Surely, ordinary fairness would have awarded to him who first published the important fact that photographers would require to be vigilant in submitting the permanent mediums on which their pigment pictures were to be laid down to a crucial test before doing so, as it is evident, from the facts brought out, that the papers undergo a great change when subjected to light. This, no doubt, accounts for the universal charge brought against carbon prints, namely, that they turn very yellow in the course of time. My card is enclosed.—I am, yours, &c.,

NOT ONE OF THE "BLACK CROWS."

Glenkennaquhair, August 13, 1878.

[The above was received too late to be inserted in our last number, for which it was intended.—EDS.]

MR. CHARLES BENNETT'S RAPID GELATINE EMULSION.

To the EDITORS.

GENTLEMEN,—I should like to ask Mr. Charles Bennett whether he pours the warm silver solution *bodily* into the bromised gelatine solution or whether he adds it a few drops at a time, with brisk shaking between each addition. I have again prepared five ounces of emulsion, and, indeed, it makes me smile to see the persistency of the thinness of the images, for the plates never vary, but, without exception, are all alike.

I would take it as a great favour if Mr. Bennett would expose and develope one or two of the plates for me. I certainly am unable at present to hit upon the cause of my failure. I now use three thicknesses of the darkest ruby-coloured glass and an oil lamp within a specially-constructed lantern, and feel certain no actinic light ever touches the emulsion.—I am, yours, &c., J. M. J. DANKS.

5, *Jesson-street, Coventry, August* 20, 1878.

EXCHANGE COLUMN.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED—

Alfred John Reynolds, Liverpool.—*Two Photographs of Lord Beaconsfield.*

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

GEO. MCDOUGALL (Montreal).—P. O. O. to hand. Thanks.

TYCHO.—There is no patent now existing for making carbon tissue in the manner you describe.

GEO. SPENCE.—The top light predominates to such an extent as to render the shadows in the face unnaturally heavy.

A. F. E.—While the drab colour is not objectionable your purpose will be much better served by making choice of paper of a light green colour.

G. B.—Address a note to the Assistant-Secretary, Mr. Cocking, 57, Queen's-road, Peckham, S.E., from whom you will receive all necessary information.

C. E. ARTHUR.—1. By advertising for a van you will easily obtain one. Several have lately been offered for sale.—2. The ordinary acetate of soda bath answers very well.

GEO. THOM.—The second lens on the list will answer well for the group, but No. 5 is quite unsuitable. It is an architectural lens, and requires a stop of such small dimensions as to necessitate a long exposure.

EXCELSIOR CO.—Insufficient fixing is the cause. Increase the strength of the hyposulphite of soda solution, and allow the prints to remain longer in that solution. The washing seems to have been effected in a sufficient manner.

G. F. LITTLEJOHN.—Yes; the light from ignited magnesium will prove sufficiently powerful. Twist two or three strands of the ribbon into a taper, and keep it moving in a lateral direction during the whole time the exposure is being made.

JOSEPH W. NICKLIN.—Not being camera manufacturers we cannot give you the required estimate of cost of altering your camera, but prefer instead to refer you to any of the various makers, whose names and addresses you will find from week to week in our advertising pages.

B. B.—With one exception the composition is excellent. That exception is found in the left foreground of the picture, in which the large white boat forms too obtrusive an object; and, not only so, but it forms an angle which is a repetition of both the distant and intermediate mountains.

OLD JOE.—The registration of a photograph does not impart a property in the copyright to the individual in whose name it is entered in Stationers' Hall. You should carefully study some articles on the subject of registration and copyright which have appeared in this Journal within the past six or seven years.

"ONWARD."—This correspondent inquires—"Which are the simplest and surest dry plates in the market for an amateur in this branch?" Before this question could be answered it would be necessary for us to have tried all the plates in the market. Does "Onward" expect us to incur the trouble and expense of doing so in order to provide a reply to his query?

ROBERT CHALLENOR.—This correspondent describes his case as follows:—"I wish to ask your advice in regard to a portrait lens I have had given me. The focus when taken on the glass is all that could be desired, but after substituting the dark slide and developing the image it is quite out of focus. I have had the camera examined by a qualified maker, and he says the camera is a first-class one, and the fault must therefore be with the lens. Please tell me the cause of this, and the remedy."——The cause will be found in the lens having been either over- or under-corrected for colour—most probably the former. It is a fault peculiar to many lenses of foreign manufacture. They give an admirably sharp and clear image upon the ground glass, but as the visual and chemical foci fall at different distances from the lens they do not "work to focus." By re-grinding the front lens this defect can easily be cured.

RECEIVED.—A. E. D. In our next.

STORES FOR CYPRUS.—Stores for Cyprus have been shipped from Woolwich Arsenal, including two photographic waggons and apparatus, and large numbers of plank bedsteads. Large quantities of compressed hay have been prepared for Cyprus, and a party of men from the Ordnance Department will shortly be sent out to take charge of the stores.

PHOTOGRAPHY IN COURT.—At the last sitting of the session of the Bloomsbury County Court the case of Boyle *v.* Chaplin was heard before Mr. Judge Russell, in which the plaintiff, described as a photographic artist, of Mornington-road, sought to recover the sum of eight guineas under the following circumstances. Mr. Willis appeared as solicitor for the plaintiff, and Mr. Dunn for the defendant. The plaintiff, being called, said the defendant's wife called at his studio and ordered a full-sized portrait of herself to be taken and finished in oil. She was told at the time what the price would be and made no objection to it, but stated at the time that she wished to present it to her husband on his birthday. Upon the lady's representations he finished the picture and sent it to her address in Albert-street, with the account and instructions to wait for payment, but the defendant's wife said that as some alterations were required she would pay the amount when they were made. After several written applications had been made for payment without success the present action was commenced. This was the plaintiff's case. The defendant, being called, said that as his wife was under a deed of judicial separation, and that as he allowed her sufficient alimony, he did not consider himself in any way liable. At this stage of the case it was suggested that the name of the wife be substituted on the summons. This being done the defendant's wife stated that she never said the portrait was intended as a present to her husband. "He was not worth it," She would have paid for the picture had she considered it a good one, but it was not, and she told the plaintiff so and asked him to paint another, which he declined to do. The plaintiff, being recalled, denied this, but acknowledged the picture had been sent back after it had been three months in the lady's possession, and as it was of no value to him he had sued for payment. He had skilled witnesses in court who could prove that as a work of art the picture was complete. The picture being produced in court and pronounced by the Judge to be an excellent one, judgment was entered for the plaintiff for the full amount claimed with costs.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

For the Week ending August 21, 1878.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

August.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
15	29·62	113	75	58	61	65	W	Cloudy
16	29·41	107	71	57	59	64	SW	Cloudy
17	29·85	106	72	52	54	60	W	Fine
19	29·85	103	73	54	61	64	E	Overcast
20	29·93	88	69	54	57	63	E	Cloudy
21	30·03	97	70	54	55	59	E	Overcast

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 956. Vol. XXV.—AUGUST 30, 1878.

ON A NEW METHOD OF CORRECTING EMULSIONS.

When we speak of the correction of an emulsion it will be, of course, understood that we refer to the important operation of so adjusting the respective proportions of soluble bromide and of silver that the preparation shall possess due working qualities. Our readers are well aware that different operators hold different opinions as to the advisability of having one or other of the ingredients in excess in the final emulsion; and, while many prefer to work with a large excess of silver, by which extreme sensitiveness is gained, by far the greater number continue to favour a slight excess of bromide, merely permitting the silver to be in excess during a portion of the time occupied in sensitising.

The operation of neutralising the excess of silver thus introduced into the emulsion—in other words, its correction—has hitherto been invariably performed by the addition of a fresh quantity of a soluble bromide, or, at anyrate, of a soluble haloid of some sort, either bromide, iodide, or chloride; and it does not appear to have struck any of our emulsion experimentalists that the same end might be effected in a slightly different manner, and without some of the objectionable features of the old method. The sole object in correcting an emulsion is to remove from it every trace of soluble silver salt, or, rather, to convert the soluble into insoluble material. By the addition of a soluble haloid this is readily effected in what would appear to be the simplest and most rational manner, the insoluble compound formed being identical in composition with the bulk of the sensitive film; but, unfortunately, the addition of an overdose of the correcting material is apt to lead to insensitiveness, and hence great care is necessary in the careful adjustment of the proportions used.

By substituting other materials for the haloid salts usually employed it appeared to us that all the advantages of a perfect correction might be secured without the same risk of destroying the high degree of sensitiveness attainable with excess of silver. A first attempt showed that not only was this surmise correct, but an additional advantage was gained, namely, greater ease in intensification—a matter in which the most sensitive emulsions are frequently deficient. Briefly, the new plan consists in substituting for the bromide or chloride usually added for the purpose of converting the excess of silver contained in the emulsion an equivalent of some organic or other acid capable of forming insoluble silver salts; or, as will be found more convenient in most cases, a soluble salt of such acid capable of reacting upon the soluble silver salt in the emulsion. It is evident that in this manner we have a large choice of materials placed at our disposal, and the introduction of various organic silver compounds into the emulsion becomes a matter of the greatest ease. We cannot as yet pretend to describe the *best* material to use nor do we offer all the substances described as actual improvements. We mention them in explanation of the direction our experiments have taken; and, in connection with one or two which seem to offer greater promise than the rest, we shall describe their special features.

Amongst the substances we have already tried we may name citric, tartaric, acetic, boracic, oxalic, phosphoric, and tungstic acids, either alone or in combination with a base replaceable by silver. Numerous other substances will suggest themselves, but these are sufficient to show the class of salts which are adapted to the purpose. Except as a matter of convenience we imagine that it is immaterial whether the uncombined acid or one of its salts be employed, unless, indeed, it be in the case of an emulsion *à la* Newton, which is required to be kept for some time without washing. Under such circumstances long contact with the free nitric acid liberated by the decomposition of the silver nitrate might possibly lead to partial destruction of the collodion film. In the case of the three last-named acids it will be found far preferable to employ the soda or potash salts in concentrated solution rather than the pure acid. The remainder, though easily applied in the uncombined state, are perhaps, for the reason we have given above, better used in combination with an alkaline base.

The first of these substances tested was citric acid. This, from its easy solubility in alcohol, is most conveniently used in the uncombined state, when, if the liberated nitric acid be objectionable, it may be readily neutralised. For a washed emulsion, however, this will not be necessary; and it may be remarked that an *excess* of citric acid—that is to say, a quantity over and above that required to combine with the free silver—will be found an actual advantage, in enabling the emulsion to better resist the action of the washing or precipitation. If the excess be considerable, and the time allowed for the ripening of the emulsion be protracted beyond a few hours, its fluent properties will be greatly diminished and the dried film rendered horny and extremely contractile.

Using citric acid in the proportion of a grain and a-half to each grain of silver estimated to be in excess, we have prepared an emulsion in which the quantity of silver actually employed was seven or eight grains per ounce in excess of the theoretical quantity necessary to neutralise the haloids in the collodion, yet the bichromate test failed to show any free silver. A small quantity of the emulsion poured into water and boiled for a few seconds did show signs of the presence of soluble silver salt; but it was due, no doubt, to the partial solubility of the citrate of silver in the boiling water. This emulsion was precipitated in the ordinary manner, and when washed until it showed no acid reaction a small quantity of the "pellicle" boiled in a test tube still showed the presence of a soluble silver compound. The mass was, however, dried and redissolved, when it exhibited not the slightest tendency to fog, but gave a clean, vigorous image with a very brief exposure. In the latter respect it was equal to any collodion emulsion we have ever made, with considerably less trouble in its preparation and greater certainty in its results. We may call special attention to the peculiarity we have spoken of, namely, the presence of traces of a soluble silver compound in the washed emulsion. It must be borne in mind, however, that the use of *boiling* water is necessary to extract this soluble matter, and hence we may infer that so long as we employ a developer at ordinary temperatures there is no danger of fog on that account.

Very satisfactory results were given by an emulsion in which the excess of silver nitrate was converted into oxalate. The behaviour of this was similar to the previous one in many respects, but the colour of the developed image was slightly different. The correction was performed with a hot concentrated solution of potassic oxalate, the additions being continued until the bichromate test showed no signs of free silver. It should be remarked that, except where a free acid is employed as the correcting agent, nitric acid or *aqua regia* should be added to the emulsion as in the ordinary processes with free silver.

Further experiments were made, substituting as the correcting agent cream of tartar, acetic acid and acetate of soda, boracic acid, phosphate and tungstate of soda—all of which have proved more or less capable of preventing fog in the presence of a large excess of silver nitrate. But we cannot as yet say much of the individual action of any of the last named, as we have been compelled to relinquish our experiments for a few days. We shall, however, at no distant date, have more to say with regard to the properties of the various salts; meanwhile we shall be glad of the assistance of other emulsion workers in this line of research. As far as we can at present judge, the use of a large excess of either citric acid or oxalate of potash produces no permanent effect upon the rapidity of the resulting emulsion. If subsequent experiments prove that this view is correct we shall have scored a most important advance upon the ordinary method of correction.

A NEW PORTABLE CAMERA.

The readers of our earliest photographic serial literature will recollect the great displays of ingenuity made by photographic amateurs in the construction of cameras. The square wooden box—perfect as it is when portability does not form an element in the requirement—was found to be quite inadequate to the necessities of the landscape photographer, and hence arose numerous ingenious devices by which the clumsy rigidity of the original camera was superseded by apparatus into the construction of which mechanical ingenuity had been imported to such an extent as to secure all the advantages of the original form with those of portability superadded.

The march of improvement in cameras has not come to a standstill, numerous refinements and real improvements having been introduced during the past few years by one or other of those makers who devote themselves to this branch of manufacture.

Without alluding to the details of the various cameras introduced during late years, and in which the desire has been in the direction of increased portability, we will at present endeavour to give a brief description of a portable camera recently introduced by Mr. S. W. Rouch (of the firm of W. W. Rouch and Co.), who has secured a patent for certain improvements that have been effected in this necessary piece of photographic apparatus.

The camera manufactured in accordance with the new patent which has been submitted to our notice is, indeed, singularly light for the size of plate for which it is adapted. This is a feature most invaluable to those landscapists and tourists who have to trudge many a weary mile "over hill and through dale" in search of the beautiful and picturesque. It also packs up in very little space, the 9×7 camera in question occupying only a space of $10 \times 9 \times 2\frac{3}{4}$ inches. We are well aware that mere portability and compactness are purchased very dearly by the sacrifice of the more important qualities of rigidity and adaptability; but in this instrument the gain appears to have been secured without sacrificing any other valuable feature.

The chief mechanical point of novelty consists in having the base-board so hinged to the body of the camera as to allow it (the base-board) to enact the twofold part of a protecting shutter to the ground glass when the camera is packed up and also its own proper function when the camera is erected for use. In order to do this the board in question is hinged in such a manner by the posterior edge of the frame containing the ground glass and bellows as to be capable of turning round to a right angle from its position as a shutter under the camera, in which latter position it forms the base-board, capable of being securely fixed by means of a screw not only at a right angle but at any angle within several degrees of this, thus forming a most efficient means by which the swinging of the back is allowed, so as to secure non-convergence of the perpendicular lines in architecture as well as sharpness of the extreme foreground in purely landscape subjects.

But it will be readily perceived that a base-board capable of forming a protecting cover for the ground glass is obviously inadequate for the performance of its legitimate functions, inasmuch as it could not extend sufficiently far forward to enable any lens save one of very wide angle to be used. This is quite true; but, to provide at once for both the extension of the camera to reasonable limits and also to admit of focussing, there is a light framework which can be instantaneously attached to the base-board, and to the outer end of which the front of the bellows body is secured. This framework, being fitted with a rack-and-pinion, is capable of yielding the most perfect adjustment of focus.

There are other details connected with the camera that will eventually be described when the specification of the patent is published. At present we have said sufficient to afford a fair idea of a camera which, from its lightness, is certain to find many admirers among tourist and landscape photographers, to whom the saving of every pound of weight is an important matter. The specimen camera we examined was one which contained all those points specially claimed in connection with it; and, while its normal position was such as to render it more particularly adapted for landscapes pure and simple, it yet possessed the requisite arrangement for allowing the plate to be reared on end so as to be placed in a suitable condition for taking a view of a church, a glen, a waterfall, or any other subject in which the composition partakes of a vertical rather than a horizontal character.

COPYING OIL PAINTINGS.

The copying of pictures and, *par excellence*, of oil paintings is a branch of photography which all beyond a select few, not even excepting professional artists, look upon with distrust, not to say aversion. It is the work generally deferred till the day comes when it must be done or declined; and when it is done the result, in a great many cases, is little better than worthless. Yet there is no real need for an oil painting to be looked upon as such a bugbear; for, by the exercise of a little time and care, combined with a thoughtful appreciation of the actual requirements of the case, the occasions are not many when a photographer of average ability cannot make a fairly satisfactory copy of any picture likely to be brought to him.

We have purposely employed the word "time" as an element in the success of the photographer; for those who have not tried the production of a satisfactory negative of, for instance, an eight-feet picture have no idea of the time taken in the fixing up alone. Every painter—at least one of any pretensions—has in his studio a large, commodious, and complete piece of machinery called a "studio easel," and with it he can readily raise or lower his canvas, place it at any angle—sideways or forwards—and, in fact, adjust it in any direction he sees fit.

But in the photographer's studio, except he be one of the few who lay themselves out for this class of work, no such thing can be found; and the time, trouble, and constant worry of shifting and altering can only be understood by those who have undergone it, on account of the absence of every likely contrivance to enable the operator to fix the picture in a suitable position with regard to light. So much is this the case that we know a professional photographer who makes a point of charging an extra fee of one guinea—that is, a guinea beyond his usual charge for this size—for taking a photograph of any oil painting brought to him. We shall mainly speak of the precautions to be taken in photographing such works when the painting can be brought to the photographer's own premises or studio.

It will be found that a large camera is difficult enough to move without any frame, and that if it be attempted, to "save the trouble of taking it out of the frame," the labour will be increased tenfold; hence we would say never receive a painting until the frame has been removed, unless it be very small in size. The picture having arrived, the first step is to place it in position opposite the camera—the arrangement of lighting will be described hereafter—and for this purpose one of the cheap easels procurable from artists' colourmen will be most serviceable. A very useful portable one can be had for a little above half-a-sovereign. When large framework has to be dealt with the photographer's own mother wit must be trusted to—in either case the point to receive attention being to see that the canvas is quite square to the lens. If this be not done—though it is not so absolutely essential as when copying a map or other object with many lines—considerable trouble will be experienced afterwards; for in any case a portion of the picture would have to be sacrificed to enable the print to be trimmed square for mounting.

The next point is the lighting. Here let us say that we have not found the slightest practical use from the employment of any of the commonly-recommended specialities, such as coloured glass before the lens, coloured lighting, &c., &c. If the operator will very carefully examine a picture so placed with the usual arrangement of lighting for a sitter he will observe patches of white light moving about in the picture as his own position alters, and, as he moves, their position in the picture will also change. If he go to one side they perhaps disappear, or if he look from a higher or lower standpoint the same thing will be observed. These spots or patches of light are reflections of the skylight and of surrounding objects; and if not removed will photograph with far more intensity than the picture itself—in fact, quite obliterate it. What, then, is required to cause such reflections to disappear?

In the first place, all light objects that are in the way must be removed. Naturally the perfection of result would be obtained if everything in the room were dead black; but, as this is impracticable, the nearest attainable approximation to it must be obtained. Light-blue studio walls are greatly to be deprecated, as it is next to impossible to avoid their appearance in some parts of the picture where least desired; and it must ever be recollected that any reflection of light objects will impress the film with greater power than the picture itself, and so swamp everything in that portion of the picture—making it look ridiculous, we might almost say. It is no use attempting to get any copy till the lighting is so arranged as to eliminate all such reflections.

It is well to call to mind the old and well-known rule as to reflecting objects—"that the angle of incidence is equal to the angle of reflection;" from which it will be seen that the nearer the illuminating area lies towards the edge of the picture the more is its reflection thrown away from the lens. Thus, assuming, for example, that the picture were illuminated by an electric light fixed (say) at the top of the camera no copy could be got, as the light itself would be imaged in the camera by its reflection from the polished surface of the painting at a spot a little above the level of the lens. If the light were fixed a little higher the reflection into the lens would take place from a spot a little higher up, and so on by gradually raising the light the spot where the reflection came from would be raised higher and higher, till at last the limit would be reached and no reflection into the lens would take place, and the perfection of illuminating, so far as this phase is concerned, would be gained; but the same effect would, of course, be obtained by lateral reflection.

This is an important matter, as upon it depends almost the whole success of the photographing, and we have dwelt thus fully upon it because if once mastered in principle the power to overcome the remaining obstacles will almost follow as a matter of course. It has taken up so much of our space that we shall defer the conclusion of our instructions till next number.

Zinc bromide, one of the most recently introduced of the haloids now used in the manufacture of collodion, possesses certain properties of its own which render it peculiarly valuable for many purposes in photography; but it is, unfortunately, a comparatively expensive salt, and its manufacture, especially to the amateur chemist, is beset by so many difficulties that it scarcely secures the amount of recognition due to it. We have to record a simple method by which it may be prepared in a state of sufficient purity for photographic use without the expenditure of any serious amount of trouble, and in the absence of any special manipulatory skill. The method is based upon the fact that cadmium is precipitated from solutions of its salts by contact with metallic zinc. All that is necessary is to make a concentrated alcoholic solution of the comparatively common and inexpensive bromide of cadmium and to throw into it a few pieces of granulated zinc, leaving the solution in contact with the zinc for a day or two, with an occasional shaking to dislodge the precipitated cadmium which clings in the state of fine powder to the surface of the zinc. When the action is judged to be complete the alcoholic solution of zinc bromide is filtered in order to remove the minute particles of metallic cadmium, and may then be used without any further treatment in the preparation of the collodion. It will, of course, be necessary to form an estimate of the strength of the solution, which may be effected by actually testing a measured quantity, or, better still, a known quantity of the cadmium salt may be operated upon at first. Thus, if we dissolve two hundred and fifty-six grains of anhydrous bromide of cadmium in one ounce of alcohol (or, rather, if the bulk be made up to one ounce after the salt is dissolved) each drachm after treatment with zinc will be equivalent to forty grains of silver nitrate. The results attained in this manner will be found at least as accurate as if the crystallised salt were employed, as the latter always contains, even when freshly prepared, a large proportion of insoluble basic salt, whence it is evident that any calculations based upon the actual weight of material used must, of necessity, be open to some uncertainty.

BLISTERS ON ALBUMENISED PAPER.—LATITUDE OF EXPOSURE.

The unusual occurrence of getting hold of some late numbers of The British Journal of Photography throws a little photographic light into my life—ignorant of iodides and bromides, gelatine and collodion, for nearly three years past; and I find that all the old enemies are not dead yet. We have got rid of some big lubbers in the political world, but you have not got rid of blisters in yours; and I am tempted to recal some experiences of mine of many years ago when I lived out of the photographic world, and had to prepare my own paper and make my own nitrate and chloride, &c.

I had one certain method of albumenising paper to avoid blisters. It was simply a first sizing by floating on dilute albumen, unsalted, which was "fixed" by floating on scalding water, albumenised side up, and then albumenising again with the ordinary albumen salts. I remember that the sample of paper seemed insufficiently sized, as the albumen, without the first preparation, dried too matt. The cause of the blisters is evidently the condition of the albumen film, which forms a cuticle *on* the paper, instead of being partially absorbed by it.

A priori, I should say that a highly-sensitised gelatine-sized paper would give a good crop of blisters, and that the only remedy, if any, is to let the paper lie in the albumen solution twice as long as usual, or until the dampness has thoroughly penetrated to the back, and mixture has taken place between the gelatine and the albumen. On the same grounds a starch paper ought to blister less, and a paper albumenised without previous sizing should be perfectly free under any circumstances. One of your correspondents suggests floating the paper that shows blisters on a bath of salted water. This ought to remedy the blistering if my theory be a good one, as a good soaking from the back would allow the sizing and the albumen to mingle, and prevent the latter from separating afterward under any osmose action.

I remember that Anderson, the late well-known Roman photographer, who was a very successful operator and printer, used to put his albumen in demijohns, and stand it in the sun till it was perfectly putrescent and limpid as glycerine, and I do not think he ever had a blister, even in the heat of Rome. The viscidity of new albumen is a great obstacle to its permeating the paper and uniting with the sizing.

Where the paper is "Hobson's choice," and will develope blisters, I advise, if unalbumenised, the soaking it (say) ten minutes in a bath of soft water, and then drying again before albumenising; if albumenised, the bath of salt water at the back, when continued till the paper is *perfectly* limp, should cure it. Alcohol at the back ought to be efficacious, as it coagulates the albumen in contact with the sizing, and prevents the osmose action tearing them apart; but if the gelatine in the paper be in excess the alcohol will have less effect than a water bath.

The discussion going on between yourselves and some of your correspondents, as to the greater range of exposure in slow dry plates than in quick or extra sensitive ones, does not seem (pardon me for-saying so to such experienced experimentalists as yourselves) to have touched the bottom of this question. That there is a latitude of exposure in plates that contain an excess of bromide much greater than where there is no such excess is a fact which I have thoroughly proved by numerous experiments. The reason of it is simply this—that where there is an excess of bromide there is a tendency in the film to recede from the development (or, as the Americans would say, to go back on the developer), while with an excess of silver or a neutral film it is almost, if not quite, impossible to avoid incipient reduction of the haloid silver once impressed by the light. It is the difference between stopping a loaded wheelbarrow going down or up hill; one is sometimes impossible, the other the easiest thing in the world—the excess-of-bromide plate having a specific determination against the development, while the other has a distinct tendency to follow it.

Iodide has the same effect in wet collodion. It is only throwing dust to say that it makes no kind of difference whether you have an exposure of minutes or seconds—that the relative difference is always the same. Anyone can satisfy himself as to that who will try the following experiment:—Take an excess-of-bromide plate and the quickest gelatine plate you can get, and expose them both in a stereo. camera, giving to the slow plate the full aperture of the lens and to the quick plate a small stop proportionate to the quickness—that is, so that the two plates ought to make a satisfactory image in the same time—and expose one half of each six times as long as the other half. Cut them apart, start the development in a tray altogether according to the requirement of least-exposed halves, and see which *over-exposed* half you can recover and make the best negative of.

The difference is not in the quickness of the plate, but in the presence or absence of a distinctly restraining element always present. A gelatine plate containing free bromide may be quicker than a collodion plate without giving, and yet give, more latitude of exposure, *i.e.*, be the safer plate for uncertain lights and general out-of-door or interior work. W. J. Stillman.

Florence, Italy.

THE APPLICATION OF PHOTOGRAPHY TO THE PRODUCTION OF PRINTING SURFACES AND PICTURES IN PIGMENT.

IN SIX LECTURES.

VI.—OTHER METHODS OF PRODUCING PHOTOGRAPHS IN PIGMENT.—DUSTING-ON PROCESS.—AUTOTYPE PRINTING.

[A communication to the Society of Arts.]

You will remember that, last week, I spoke of the use of india-rubber rollers for the inking of collotype plates, and that I recommended a roller made with a thin surface of red india-rubber on a body of the glue and treacle composition used for typographic rollers. At the conclusion of the lecture Mr. Dallas informed me that Messrs. Blades, East, and Blades, of Abchurch-lane, have recently introduced into commerce a roller consisting of a thick layer of red vulcanised india-rubber on a rigid stock. These rollers are made under a patent of Mr. Lanham, manager to the above-mentioned firm, and will, I am convinced, prove of very great value to lithographers as well as to collotypic printers. The manufacturers have kindly lent me some specimens of their rollers, which are now on the table.

Up to the present time we have been studying the means of producing, by the agency of photography, printing surfaces from which copies might be obtained without any further intervention of light; but in this, the last lecture of the series, I want to call your attention to some methods for the production of pictures in pigment which necessitate a separate and direct action of light for the production of each picture.

Here is a glass plate, and I pour on it a mixture containing twenty-five parts of glucose, four parts of honey, and four parts of ammonia bichromate, dissolved in 120 parts of water. I lay the plate on the hot-water apparatus, and it will be dry in a few minutes. If the dried plate be exposed to the atmosphere it will absorb moisture, and the whole surface will become sticky. Now that the plate is dry and while it is warm I will place it behind a transparency and allow a strong light to shine on it through the transparency. The joint action of light and ammonium bichromate tends to make the honey and glucose insoluble; or, at anyrate, it prevents these materials from absorbing moisture from the air, as they tend to do naturally. Let us now take the plate out of the frame and examine it. A very faint image may be traced thereon, but only those of you who are near can see it. Now, what is happening to this plate? Those parts which were protected from the light are absorbing moisture from the air, the honey and glucose being here unaltered, while those parts which were exposed to the full action of the light refuse to absorb moisture, and those parts which have been protected from the action of a part of the light absorb an amount of moisture proportionate to the degree of shade afforded by the half-tones of the transparency. Now note the effect of dusting powdered blacklead over the plate, and rubbing it on with a soft brush. Those parts which are dry refuse to take the blacklead, while those parts which are moist hold an amount of blacklead proportionate to the degree of moisture. Now look at our plate, and you will see that there is a picture showing all degrees of light and shade, the picture being formed of blacklead, held by the various degrees of moisture absorbed from the air. The next step is to coat the plate with collodion, and to immerse it in water, in order that the yellow ammonium bichromate may diffuse out. Other pigments than blacklead may be employed, and the pictures may be made on paper or other materials; but the dusting-on process, although interesting as a means of producing permanent photographs, is not worked commercially to any great extent.

We now pass on to the study of a process of much greater importance than the dusting-on method, namely, the so-called carbon process, or the autotype method. The first step in this process consists in coating one side of paper with a tolerably thick layer of gelatine, to which a little sugar has been added, together with sufficient pigment to strongly colour the mixture. Here is a piece of the "pigmented tissue," as it occurs in commerce. To prepare it about three parts of gelatine and one part of sugar are dissolved in water, and the pigment is added in sufficient quantity. A band of paper is then drawn over the surface of the mixture in such a way as to coat its surface with a uniform layer of the composition. The pigmented tissues are prepared on a large scale by the Autotype Company and others, and few will care to prepare their own tissue, excepting for experimental purposes.

To make the tissue sensitive to light it is soaked in a solution of potassium bichromate containing about three and a-half per cent. of the salt. You see that this piece of tissue has now become quite flaccid from the absorption of the solution; so I scrape off the excess of solution by drawing the tissue over the edge of the dish, take it out, and hang it up to dry. When dry it will be ready for exposure under the negative. Here is some which has been previously dried, and I will put a piece under this negative and expose it to the action of a bright light. In the ordinary process of silver printing one can watch the progress of the operation, and can easily tell when sufficient exposure has been given. Not so in the case of the tissue, as it undergoes no visible change by exposure to light. Here is a little tin box having a small glass window in its lid, and a strip of sensitive silver paper can be drawn forward under this window. The lid having been shut down so as to press on the strip of silver paper the tin box is exposed to light simultaneously with the printing-frame containing negative and tissue, and as soon as the silver paper has acquired a certain standard tint or degree of darkness it is considered that the tissue has had one unit of exposure. The silvered paper is then drawn forward so as to expose another portion, and so on until as many units of exposure have been given as the tissue is known to require when exposed under the negative in hand. This is quite easy in practice, as a little experience will enable one to judge how many units of exposure, or "tints," will be required by each negative, and one guide-box, or "actinometer," serves for any number of printing-frames. The tissue which I just placed under a negative has now had sufficient exposure to light. I take it out, soak it in water until it is soft, and then, while it is still in the water, I bring it in contact with a piece of paper which has been coated over with a thin layer of insoluble gelatine, so as to make it impervious to water. The tissue and the impervious paper are drawn out of the water together, and an application of the squeegee now removes the excess of water which remains between the two surfaces, and the exposed tissue adheres to the impervious paper. Let us allow them to remain in contact for a few minutes, in order that the tendency to adhere may become greater.

Bear in mind that the bichromatised and pigmented gelatine becomes insoluble by the action of light shining through the negative, and the depth to which this insolubility extends is dependent on the amount of light which has acted on it. On those parts of the tissue which have been exposed to much light a thick layer of gelatine is made insoluble, while on those parts which have been exposed to only a little light the insoluble layer is very thin.

Now, we want to wash away the soluble portions of the gelatine from the exposed tissue, and to leave the portion made insoluble by the action of light, just as in the Woodburytype process; but if the exposed tissue were put directly into hot water the insoluble image would become undermined by the dissolving away of the gelatine from underneath it, and it would become destroyed for want of a support sufficiently strong to hold it together. You can now understand why the exposed tissue was mounted on a piece of impervious paper, this being intended to hold together the insoluble gelatine image during the treatment with warm water. Here is the tissue, which I mounted on a piece of the impervious paper, or single transfer paper. Notice the effect of putting it into a dish of warm water. You see that the soluble gelatine in which the insoluble image is embedded melts and exudes from under the edges of the paper, while the application of a very little force will now enable us to separate the two papers, viz., that on which the tissue was originally made and the impervious paper on which the tissue was mounted. Under these circumstances the insoluble image naturally adheres to the impervious paper, or single transfer paper; but it is at present clogged up by some of the soluble gelatine, which must be removed by rinsing with warm water. You see that this soon dissolves away, leaving the image on the single transfer paper. Here it is. This image consists of varying thicknesses of gelatine made insoluble by the joint action of light and a bichromate, but as the gelatine contains a black pigment (carbon) it shows on the paper as a picture in black and white. This is the simplest form of the carbon or autotype process. It is known as the single transfer process, and, as a little consideration will show you, it requires a reversed negative; that is to say, a negative in which the sides of the picture are reversed, left hand being where right hand should be, and right where left. This disadvantage is obviated by the so-called double transfer process. According to this method the picture is not developed on the support which is ultimately to hold it, but on a temporary support, from which it is removed by the application of a sheet of adhesive paper.

Yonder, at the other end of the table, stands Mr. Foxlee, surrounded by carbon printing materials of every kind, and he has kindly consented to demonstrate the principal phases of the carbon process with some materials and partly-finished prints, for which I am indebted to the Autotype Company. I see that while I have been talking Mr. Foxlee has been busy; he has mounted some pieces of exposed tissue on waxed zinc plates, some on collodionised opal glass, some on single transfer paper, and others on a material known as Sawyer's flexible support, and which I shall describe to you directly. To all of these the wet tissue adheres perfectly well; and, as the prints are now ready for development, Mr. Foxlee is putting them into trays of warm water. Notice how he strips the paper off as the soluble gelatine dissolves, and how the pictures will gradually unfold when he rinses them with warm water.

I want you now to take notice of the flexible support introduced by Mr. Sawyer, the talented director of the Autotype Works. Its basis consists of hard paper coated with a layer of insoluble gelatine. This is floated on an alkaline solution of shellac, which softens the gelatine on the surface bonds with it, and forms a thin film of varnish over it. When dry the flexible support is rubbed over with a weak solution of wax and resin in oil of turpentine, in order to prevent the possibility of permanent adhesion between the flexible support and the gelatine picture. The great advantage of this support consists in the fact that the fine details of the gelatine picture are not crushed against a rigid surface in the mounting and subsequent treatment. This will be illustrated further on.

Mr. Foxlee has now finished developing his pictures. Those developed on single transfer paper are finished, as after development they only require rinsing in cold water, a dip in alum solution to harden the gelatine, and then a second rinse to remove the excess of alum. You see that among the single transfer prints which Mr. Foxlee has developed are some very fine large portraits; but Mr. Foxlee makes large prints as easily as others make small ones. He thinks nothing of making them three feet by four feet, or even larger. Now, here are the prints which Mr. Foxlee has developed for double transfer—some on zinc plates, some on Sawyer's flexible support, and others on opal glass. I see that he has a number of pieces of the so-called double transfer paper in a dish of warm water before him. This paper is coated on one side with gelatine, to which a little alum or chrome alum has been added, and when it is put into warm water the surface become sticky, but the gelatine does not dissolve. On each of these prints, which have been developed on the various supports, Mr. Foxlee is placing a sheet of the wet and sticky double transfer paper, and after having ensured contact by means of the squeegee, he puts them aside to dry; when they are dry it will be found that the paper can be easily stripped from the temporary support, carrying the print with it. In order to illustrate this Mr. Foxlee has provided himself with some transferred prints already dried and ready to strip from the temporary support. You see that Mr. Foxlee is now stripping the prints from zinc plates; he just inserts his thumb-nail under one corner, and then a slight pull brings the print off. Now he is similarly stripping prints which have been developed on collodionised opal glass. Notice what a fine, enamel-like lustre they have. Next, he will separate the prints from Sawyer's flexible support. You see how easily they separate; and if you carefully examine the flexible support from which a print has been separated you will be able to trace a faint intaglio image of the print, showing how the image sinks into, and is protected by, the flexible support. The single transfer process and tissue making are now untrammelled by patent rights; but the double transfer method and the manufacture of Sawyer's flexible support are subject to patents held by the Autotype Company, and licenses for the working of double transfer are granted on almost nominal terms.

Mr. Foxlee will now illustrate to you the method of making carbon pictures on ivory and on artists' canvas. He has developed pictures on the flexible support, and while they are wet he lays them down on the ivory and on the canvas—which, by-the-bye, have been previously prepared with a thin film of partially insoluble gelatine—and makes contact by means of the squeegee. When dry the flexible support can be peeled off, leaving the print on the ivory or on the canvas. You see that Mr. Foxlee is now stripping the flexible support from some specimens which he had previously prepared. Very beautiful transparency pictures can be produced by the carbon process, it being merely necessary to squeegee the exposed and wet tissue on to a piece of collodionised glass, and after a few minutes to develope in warm water. Mr. Foxlee is now developing some, and when they are finished I will exhibit them to you by means of the magic lantern. The process I have described to you is generally known as the carbon process, it having arisen out of an earnest desire to obtain non-fading photographs; and as carbon is the type of a non-fading pigment it was naturally used at first, either in the form of a lampblack or of indian ink. As time went on people wanted other tints, and it was considered especially desirable to imitate the purple tint of a gold-toned silver print. This was done to perfection by the use of a mixture of lampblack, indigo, and cochineal lake; but, unfortunately, the prints so coloured were found to change their tint owing to the fading of the cochineal lake. Attempts were soon made to replace the fugitive cochineal colour by permanent reds, and notably by madder red or alizarine, but until recently with only partial success, as ordinary madder lakes work mischief in the tissue. Mr. Sawyer has, however, recently overcome all difficulties with regard to the use of alizarine in tissue, and alizarine is now used in all the tissue of the Autotype Company, which imitates the "photographic tone," or series of tints shown by silver prints.

The kindness of many eminent carbon printers has enabled me to show you a splendid collection of prints tonight. The Autotype Company have lent me several hundreds of their well-known and admirable productions, ranging in dimensions from four feet high to pin or brooch size. MM. Braun and Co., of Dornach, have kindly lent me specimens which are of the first order, and I want you to especially notice the excellence of two untouched portraits kindly lent by the Woodburytype Company. Among the more recent carbon painters we have Mr. Witcombe, of Salisbury, who has sent a very fine collection of small prints; but as they arrived too late to be displayed I have placed them on the table. You will see over yonder a frame containing some prints made by a process due to Sir Thomas Parkyns. The carbon prints being covered with a film of coloured collodion very striking effects are produced, imitating moonlight and other effects.

Mr. P. Le Neve Foster has lent me a carbon print made by Mr. Pouncy twenty years ago, and if you look at it you will see that in detail and delicacy of gradation it is quite equal to the productions of more recent times; and I have here some carbon prints which were made by Mr. Foxlee nearly as long ago. I should like you to look at these, as they are an illustration of what was done during the infancy of carbon printing.

In these lectures I have not attempted to give anything like a history of phototypography; I have not even mentioned many important processes. Had I referred to all, the six lectures would have been merely an index to the work which has been done. I wish I had been able to give you more details of the processes described; but you must bear in mind that days rather than hours are required for properly demonstrating the simplest photo-mechanical process, and real working and practical demonstrations can only be given in the quiet of the laboratory and to a very small number of people at a time.

Before you go I want you to appreciate the help which Mr. Barker and Mr. Debus have afforded me—not only in work incidental to the delivery of the lectures, but also in the work of preparing materials for them. Do not forget also the thanks which are due to Mr. Foxlee for his admirable demonstration of the carbon process.

Thomas Bolas, F.C.S.

TRANSFER PAPER AND FADING.

The great interest felt in pigment printing at the present time is well shown by the eagerness with which Mr. Tunny's discovery of the degradation in tone suffered by transfer paper on exposure to light is being discussed, as well as by the evident determination of those peculiarly interested in this branch of photographic art to run the cause to earth, and, if possible, eliminate it.

In my former article on this subject I stated that I had seen samples of plain paper in the hands of Mr. Tunny that had been exposed simultaneously with the transfer paper and prints, and on which no change of tint was visible. Since then the Autotype Company, to whom we are indebted for so much that is good in pigment printing, have gone heartily into the question, with the result, apparently, of relieving the gelatine and chrome alum from the odium which at the first blush was likely to attach to them, and transferring it to the paper itself, or to some of the material used in its manufacture.

That the latter is more likely to be at fault is, I think, evident from the fact that only certain samples suffer the degradation of tone complained of, while others remain apparently unchanged. This, if it should prove true, is so far gratifying, as it effectually disposes of the fears that have been expressed in regard to the probability of silver prints suffering from a like cause. The various operations or processes to which silver prints are subjected constitute a severe test of the suitability of the paper employed, and consequently the supplies have for many years been drawn from a very limited number of manufacturers, who confine them almost, if not altogether, to the production of an article that is as nearly as possible faultless. That the papers known as "Rives" and "Saxe" are unaffected by light I have had as ample evidence as is afforded by their remaining unchanged after an exposure to bright sunlight for at least ten days; and this applies both to prints, albumenised paper, and plain paper.

The same experiment, however, showed the folly of employing aniline colours to produce the various tints that were at one time popular, and are still occasionally used. Many samples, including pink, mauve, drab, and blue have been experimented with, the result being, in every case, that the tint rapidly disappeared under the influence of sunlight. This would be no great drawback if the prints made on such paper suffered nothing further than the loss of the tint, but the evil does not stop there. It is well known that much of the beauty of a print depends on the care and skill of the printer, and that the exact depth to which the printing is carried and the checking of the action of the gold in toning, are important factors in the production of very high-class results. It will, therefore, be easily understood that the tone or tint of the albumenised paper on which a print is made will materially influence the judgment of the printer in carrying out those delicate operations, and that just in proportion to the perfection of the result he obtains will be his disappointment at its appearance when the tint has been bleached out by exposure to light. Photographs printed on tinted paper are at best very doubtful improvements on those on paper without a tint, and there can be no doubt at all as to their inferiority when the tint has disappeared, but silver prints on the pure white paper at present in general use, however they may fade from other causes, may be relied on as perfectly stable, so far as that paper is concerned.

But while I would deprecate any unnecessary alarm in this direction, I must equally condemn the flippant, frivolous tone assumed by some in the discussion of Mr. Tunny's discovery. Such flippancy could be indulged in only by those who are ignorant of the extent to which some samples of commercial transfer paper become discoloured—an extent to which the objected-to "cheesy" simile hardly applies, as it is more like freshly-cut mahogany. As this may be, by those writers to whom I more particularly allude, thought an exaggeration, I may say that I saw the specimen referred to in Mr. Tunny's establishment one day this week, and have no doubt he will gladly send it to the Editors for exhibition to whoever may care to call and see it. It was an enlargement made by double transfer in the ordinary course of business, and which, before being handed to the finisher, was placed in a printing-frame and exposed to sunshine for a few days. The high light on the forehead had been partly protected, and the covered portion remained quite white, while the uncovered part was certainly as brown as the wood already named—a colour, I make bold to say, that would not be assumed, no matter what the exposure might be, by any sample of ordinary paper in the market.

We may take it for granted that those having large commercial interests in carbon printing at stake—and I suppose every photographer is more or less interested in the subject—will do what they can to eliminate the element of discolouration from the material with which transfer paper is prepared; but they will still be at the mercy of the manufacturer so far as the paper itself is concerned. It is, no doubt, true that they may, with perfect confidence, rely on the suitableness of the productions of the few who have made the manufacture of photographic paper a speciality; but it is not in human nature to pay a large price for an article if one equally suitable can be bought for a smaller sum, and there is no reason why it should be so. In the interest of all concerned the best paper at the lowest price should be the desideratum; and as, according to the experiments of the Autotype Company, some samples of ordinary commercial paper are not liable to discolouration, it is the duty of the experimentalist to discover the cause thereof, and so put the manufacturer on the right track.

With this object in view I have recently visited one of the largest paper mills in the country, and had access to what may be called the laboratory journal, in which is noted the composition and method of production of every sample of paper produced, and have been in correspondence with, and received samples from, several other manufacturers.

Roughly speaking, commercial paper may be divided into three kinds—that made from rags alone, from a mixture of rags and esparto, and from esparto alone. The rags generally, and the esparto in all cases, is boiled in an alkaline solution, and both are, as a rule, bleached by chlorine, which is subsequently completely removed by the action of soda hyposulphite. The use of this latter substance has been frequently objected to by photographers on the ground of a suspicion that traces might be left in the finished article sufficient to prove injurious in some of its applications; but, as I showed in a former article, this suspicion is perfectly groundless, the supposed indication of hypo. occasionally found in some samples being due probably to sulphurous acid employed in the manufacture of gelatine size. Those three varieties may be each subdivided into several others, *i.e.*, those in which the "natural colour"—that is, the colour produced by the chlorine—has been allowed to remain; those that have had the colour brightened by a minute trace of blue in the shape of ultramarine or smalts, or pink by cochineal; those sized with gelatine, or "tub sized," and those with an alkaline solution of resin, or "engine sized." There are, of course, many other varieties, but those mentioned include all that are likely to be used in the preparation of transfer-paper, and it is to them that I propose turning my attention.

It is no doubt quite true, as has been elsewhere remarked, that those who possess valuable pictures are not likely to expose them for weeks or even days to brilliant sunlight, but, nevertheless, a conscientious photographer will hesitate to transfer his prints to a paper that will not stand even that severe test; and, as it would be manifestly inconvenient for the manufacturer of transfer-paper to apply the test to each supply obtained, it becomes a matter of considerable importance to ascertain if possible, once for all, what particular variety or varieties are to be trusted.

As a contribution towards the attainment of this desirable result I have prepared three sets of specimens of each of the samples of paper obtained, and exposed them in the observatory on the roof of my house, where they will be subjected to the unobstructed rays from sunrise to sunset. The first set is plain paper just as received, the second has a thin coating of gelatine, and the third a coating of the same with the addition of chrome alum. Of course the exposure has as yet been too short to warrant the drawing of any deductions from such changes as may have taken place; but, from experiments made for another purpose some time ago, I am under the impression that both the esparto and rag papers—and, consequently, paper from a mixture of the two when bleached, so as to require no brightening tint, technically "natural colour paper"—will remain practically unchanged after exposure for many days. Those papers, however—and they are the rule, natural colour papers being the exception—that have required brightening by bluish or pinkish tints will probably suffer such degradation in tone as to render them unfit for the manufacture of transfer paper.

I shall watch the specimens day by day, and return to the subject after a sufficient lapse of time, in the hope of being able to definitely indicate what may be used and what avoided.

John Nicol, Ph.D.

THE RECENT ECLIPSE.

The following article, contributed to *Nature*, was written by Mr. J. Norman Lockyer just previous to the eclipse. It contains matter of great value to photographers:—

When I wrote two articles in *Nature* a little while ago, discussing the various methods which I thought might with advantage be employed next Monday, I little thought that it would fall to my lot to come to America to take part in the observations. The Fates, however, have so ruled it, and here I am, in what was not long ago called the "Great American Desert," but by no means a martyr to science; for, although Rawlins, where I now am, is nearly 7,000 feet high, and near the Rocky Mountain divide—although elk and antelope may be shot within a mile of the town—yet the sluggard is roused at six by the voluminous whistle of the railway works; there is a thriving "city" and population.

The energy displayed by the American astronomers is, if possible, greater than I anticipated. There is scarcely a man of note among them who is not now along the totality line which runs from the Yellowstone Park to the Gulf of Mexico. Where the wonderful Union Pacific Railway cuts the line east and west there will be four stations—Rawlins, Separation, Fulmore, and Creton. Along this line will be gathered Professors Newcomb, Harkness, Draper, and Watson, with their many assistants. In the middle region, including Denver Central City and Pike's Peak, will be Professors Young, Holden, Langley, Cleveland Abbe, and General Myer, the chief of the Weather Signal Service. The parties under these are many of them numerous, Professor Young's camp, for instance, including thirteen persons. In the southern region, at Pueblo and Los Animas, Professor Hall heads a large party, including Professor Wright, of Yale, and Professor Thorpe and Dr. Schuster from the old country.

In all three groups of stations the various kinds of work have been divided in a most judicious manner. In all attempts will be made to obtain the spectrum of the chromosphere and coronal atmosphere in the way suggested in my previous articles; in all the structure of the coronal atmosphere will be carefully inquired into. So far as photographs of the corona are concerned, perhaps the strongest attack will be made by an impromptu party not referred to in the preceding enumeration. On my way here from Cheyenne it was my great good fortune to travel with Professor Hayden, *facile princeps* among the great geological surveyors of this vast continent. He was on his way to the north, and, as usual, had with him a strong photographic equipment. As his march lies along the line of totality he will obtain, or at all events endeavour to obtain, a large series of photographs.

It is agreed on all hands that never has such summer weather been known in this locality. Ordinarily the chances, as determined by the officers of the signal service from their registers, are—northern stations, eighty per cent.; Denver, sixty; Pike's Peak, forty; and Los Animas, eighty; but here, for the last fortnight, fine mornings have been succeeded by a break-up in the weather in the afternoon, while at Denver matters have been much worse.

A most valuable second series of instructions, written by Professor William Harkness, of the United States Navy, by direction of Admiral Rodgers, has been published. Of these, sections i., ii., v., and viii. describe such observations as can be made with ordinary apparatus, while the other sections relate mostly to observations which can only be carried out by persons who are able to command expensive apparatus, and who are skilled in astronomy and physics.

This is a most useful following up of the work of organisation undertaken in England for the first time in 1870, and carried out in 1871 and 1875.

Professor Harkness has freely availed himself of the instructions compiled for the English expeditions of those years, and in his carefully-written memorandum has given us an opportunity of seeing how the problems have been advanced of late years; he has also collected a valuable series of data which give permanent value to it. I do not think I can do better than refer to some of the more important points touched on in the instructions.

All the most rapid varieties of lenses in the market suited for use as equatorial cameras are given in the following table, in which the corresponding intensity ratios have been taken from Dallmeyer's catalogue.

Reference No.	Description of photographic objective.	Intensity ratio.*	Focal distance of largest lens made.	Diameter of image of sun.	Exposure required for the corona.
			Inches.	Inches.	s. s
1	Extra quick-acting portrait	$\frac{1}{2}$	$5\frac{1}{2}$	0·051	0·3 to 1·6
2	Quick-acting portrait..........	$\frac{1}{3}$	$13\frac{1}{2}$	0·126	0·7 to 3·6
3	Ordinary portrait	$\frac{1}{4}$	24	0·224	1·3 to 6·4
4	Portrait and group (D)	$\frac{1}{6}$	33	0·308	2·9 to 14·4
5	Rapid rectilinear	$\frac{1}{8}$	$33\frac{1}{2}$	0·313	5·1 to 25·6

Professor Harkness points out that "the data from which to determine an approximate value of C for the corona are very limited." He considers that it is probably safe to conclude that, with a clear sky and a moderately high sun, exposures in which the value of C is about 0·002 will give only the prominences and the outline of the moon. When C becomes 0·08 the corona will begin to appear, and will increase in extent as the exposure increases—at least up to the point where C becomes 0·40. Accordingly the shortest exposure specified in the table above corresponds to C=0·08, and the longest to C=0·40.

If we adopt a lens of thirty-three inches focus an attempt can be made to use the lens for another purpose, "even more important than photographing the corona"—that is, in the search for intra-mercurial bodies. Professor Harkness points out that the magnitude of its intensity ratio enables it to depict faint objects rapidly, and the extent of its angle of view is such as to embrace a field of more than forty degrees. The lens will cover a plate measuring twenty by twenty-two inches; but, as it is desirable to keep the apparatus light, plates measuring seventeen by twenty inches, which will suffice to cover a space of thirty-three and a-half degrees along the ecliptic, are recommended.

"Assuming the adoption of an equatorial camera twenty inches square, provided with a lens whose intensity ratio is one-sixth, and whose focal distance is about thirty-three inches, it yet remains to consider how this apparatus should be managed during a totality lasting only three minutes. As the illumination of different parts of the corona varies greatly there can evidently be no certainty of getting all the details of the phenomenon unless a series of plates are taken, in which the exposures vary from the shortest possible up to the point where it is certain that an increase of time does not improve the picture. On this account it will be desirable to take as many as six plates, the exposures being, respectively—

3^s, 5^s, 10^s, 20^s, 40^s, and 60^s.

The first four of these plates will receive such short exposures that it is unlikely they will show anything but the corona, and therefore their size should be four and a-quarter by five and a-half inches. With the last two plates the case is different. Their size should be seventeen by twenty inches, because their longer exposures will probably suffice to bring out upon them any bright points which may exist within their field. A lens such as is here under consideration should depict an eighth-magnitude star in about one minute; but of course the intensity of the sky illumination during totality will determine the limit of brightness at which faint luminous points will cease to impress themselves upon the negatives, and what this limit may be it is impossible to predict. The necessity for at least two large plates is evident, when it is remembered that the image of a small bright point could not be distinguished from an accidental blemish in the film, and it would only be by finding it upon both plates that its true character could be unmistakably recognised. It is exceedingly desirable to determine accurately the maximum exposure that the corona will bear with advantage, and it is hoped that on at least one of the large plates it will prove to be over-exposed."

It has been proposed to photograph the red prominences on a scale of ten seconds of arc to a millimetre. The optical apparatus for the production of such pictures must have an equivalent focal distance of 2062·7 centimetres, or 812·1 inches, and if we take *C* equal to 0·002, which is probably very near the truth, the value of *t* for lenses of various apertures are given as follows in the instructions:—

Aperture of objective.	$\frac{F}{d}$	$\left(\frac{F}{d}\right)^2$	Exposure required.	Motion of moon.
Inches.			s.	″
6	135·3	18306	36·6	20·1
8	101·5	10302	20·6	11·3
10	81·2	6593	13·2	7·2
12	67·7	4583	9·2	5·0
15	54·1	2927	5·8	3·2
20	40·6	1648	3·3	1·8
26	31·2	973	1·9	1·0

As a prominence one minute high could scarcely be photographed with a six-inch objective, because twenty seconds of its height would be covered by the advancing moon before the exposure was over, Professor Harkness thinks it does not seem possible to photograph prominences, during eclipses, on the scale here contemplated with an aperture much less than ten inches.

The section relating to telescopic observation is very full and complete. Full instructions concerning the structure of the corona are given, and the remark is made that "since the spectroscope furnishes an efficient means of studying the red prominences at any time, it will be very undesirable to waste a single one of the precious moments of totality in examining them."

To facilitate the work of such astronomers as may desire to search for intra-mercurial planets with considerable telescopic power, a chart is given showing every star so large as the seventh magnitude in that portion of the heavens which will be occupied by the sun on the 29th of July next. The black circle in R.A. 8h. 36m. Dec. + 18° 39′ indicates the position of the sun. Mercury, Regulus, and Mars will be pretty close together, and probably quite conspicuous during totality; but they are so far to the eastward that only the last-named comes within the limits of the chart. Venus may also be seen, but she will

* If F is the equivalent focal distance of a photographic objective, d its working aperture, C the exposure constant, whose value depends upon the intensity of the light and the sensitiveness of the chemicals employed, and t the time of exposure required to produce a good negative, then the intensity ratio is $\frac{d}{F}$ and $t = C\left(\frac{F}{d}\right)^2$.

be low in the western sky. While looking for planets, the possibility of discovering a small comet, or a meteor stream, should be borne in mind.

"The corona forms a luminous background upon which the moon's limb is sometimes seen projecting beyond the sun; and a little before totality it is even possible that the complete outline of the moon may become visible. Look for these phenomena, and note the time of their occurrence. It is difficult to assign any reason for the existence of rays, or brushes, of light at the cusps of the sun, but it is said they have been seen. If any such appearances present themselves they should be carefully scrutinised to ascertain if they change either their position or intensity; and the interior of the telescope should be examined to make sure that they do not originate in reflections, either from the tube or from the lenses."

The instructions as to the use of the spectroscope and polariscope are so full that they deserve reprinting *in extenso*. I shall therefore say nothing about them here except to express my belief that no stone has been left unturned to secure results, if results be possible. Spectroscopically, I suppose Dr. Draper and Professor Young have the strongest outfit, while, so far as I know, Professor Harkness is the only one who is equipped for photographing the polarisation of the corona.

For the first time thermo-electric observation forms part of eclipse work. One of the many points of interest here, to me, has been the observatory in which Mr. Edison has been experimenting on his tasimeter. It is truly a very wonderful instrument, and from the observation made last night on the heat of Arcturus, it is quite possible that he may succeed in his expectations. For its extreme delicacy I can personally vouch. The instrument, however, is so young that doubtless there are many pitfalls to be discovered. Mr. Edison, however, is no unwary experimenter.

So much, then, for the present. The day after tomorrow will find us all busier than ever, and if the weather prove fine I hope I shall have, as in 1870 and 1871, another distinct advance in solar physics to chronicle. J. Norman Lockyer.

Rawlins, Wyoming Territory, July 27, 1878.

ON THINGS IN GENERAL.

"Death in the Boudoir." Every one is familiar with the story of the sailor who pitied the poor landsmen in a storm for the danger they were in from falling chimney pots, tiles, and slates, and the anecdote is an apt illustration of the perils that environ civilised life. There are, however, dangers beyond individual effort to curtail or prevent, and such must be accepted in the best spirit; but what would be said of the man who wilfully hung all about his dwelling-house, trembling in insecure equilibrium, the same lethal dangers? A lunatic asylum would be his fittest abode. Yet we have recently discovered a danger far greater lurking unconcealed, yet unknown, in the boudoir of my lady, in the drawing room, and in the humble parlour of the hard-working artisan, and we shudder at possibilities hitherto unrealised. Let every one open his familiar album of *cartes*, and handle tenderly those specially beautiful, highly-glazed products of the camera. We tell him that there lurks the deadly torpedo of private life. That glaze, meretricious and attractive, is composed of the deadly gun-cotton—gun-cotton that gives energy to the deadly torpedo; that shatters rocks, and in a moment of time blows into powder the costliest monuments of man's ingenuity, awaiting but due friction applied to give play to its superhuman energy. Imagine a fond lover in a transport of affection, in the absence of the loved one, pressing with fervour to his lips the torpedo-coated *carte* of the joy of his life, finding himself rapidly conveyed in small particles to various parts of the room—too late to discover the cause. But happily we are able to prevent such a catastrophe and have revealed the danger, and we feel ourselves rewarded for all our trouble and the expense our investigations have caused by the thanks of a hundred thousand present or prospective album owners.—*Daily Gusher*, 1880.

It will be seen that the above extract has not yet been published; but my readers will bear me out in saying it is a good imitation of the ridiculous "scares" of a quasi-scientific character that the daily papers are perpetually originating. The idea in this particular direction came to me from reading a highly-sensational leading article as to the dangers of artificial teeth made of a material in the composition of which something distantly resembling gun-cotton is employed.

Scares have been abounding of late. When I see an old silver print toned by the modern alkaline bath turning a sickly yellow I know its fate is sealed; and the public too, I guess, have learnt what it means and would very soon have something to say, whether logically right or not, if a so-called "permanent print" in their possession took on this yellow cast. Hence I feel very much obliged to Mr. J. G. Tunny for calling attention to a hitherto unsuspected danger in conjunction with the integrity of carbon prints. I am amused by the way it is attempted to show that it is "a mere nothing, Sir"—more particularly when I see in the last issue of the Journal a correspondent hints that in some obscure place attention has been called before to the same thing. It may have been, for aught I know; but the body of photographers are indebted to the Editors of The British Journal of Photography and Mr. Tunny for bringing it before them.

I question whether thanks are due to other people for the latest improvement in connection with permanency and freedom from spots. I notice in a foreign contemporary that a gentleman has discovered the true source of fading spots. There are long spots and short spots, and round spots and square spots—spots with a centre and spots with no centre; but it is none of these. It is a spot that is round and white, making its appearance immediately after mounting the print. The cause is acidity of the cards. The remedy—but that I must give in the writer's own words—is one "*qui consiste à passer les cartons dans une eau ammoniacale avant le collage si l'on ne peu pas les refuser au fabricant.*" At first I thought the writer must be in the employment of the card makers, desirous of getting increased orders in consequence of their customers passing their mounts through a bath of ammoniacal water, until I saw he suggested that the cards were returned to the maker. Fancy the beautiful appearance that would be presented by (say) an enamelled card with gilt edges after a bath of ammoniacal water! Free Lance.

ON PROCESSES OF MAP PRODUCTION BY PHOTOGRAPHY.*

The Production of the Negative.

After the due preparation of the original, the production of the negative is a point of the utmost importance, and may well be considered by itself before proceeding to the consideration of the various processes of photographic printing.

In order to obtain the most satisfactory results for photolithography, photozincography, or any other process specially applicable to line subjects, the negative must be perfectly sharp all over, free from distortion, and possess the greatest amount of contrast between the lines and the ground. If care be taken to produce good negatives from suitable originals results may be obtained which will compare with ordinary lithographs and engravings for sharpness and delicacy. The difference in the results of working with good negatives or bad ones is incredible; with a good negative from a good original everything works well, but with a bad negative from a faulty original all kinds of difficulties may be encountered, and the attainment of a passable result is almost a matter of chance.

The negatives of maps, &c., drawn in line only, for reproduction by photozincography, are taken by the ordinary wet collodion process with iron development, modified so as to secure the greatest transparence in the lines and density of the ground; but, as the ordinary wet collodion process by itself will not give all the intensity required to produce an almost opaque ground, it is obtained by intensifying the negative in the usual way with pyrogallic acid and silver, after fixing, then treating it with a saturated solution of bichloride of mercury till the film becomes white, and finally applying a dilute solution of hydrosulphate of ammonia, which instantly changes the colour of the film to a dense black or brown throughout. The negative is afterwards varnished with a resinous varnish, or flowed over, while wet, with a solution of gum or gelatine, and allowed to dry. All defects, pinmarks, &c., are then stopped out with Indian ink or black varnish. In taking the large negatives, on plates 32 × 24, that we are now producing for copying the maps of the Cadastral Surveys, it has been found that the first intensification may be produced by washing the plate after the first development and applying a weak solution of nitrate of silver, followed by a second application of the iron developer.

Other methods of obtaining the extra density required for these negatives have been proposed and are in use,† but, notwithstanding several inconveniences arising from the use of bichloride of mercury and hydrosulphate of ammonia, the above appears to be the best and most certain when working on the large scale.

When maps are not drawn entirely in pen and ink, but have the hills brush-shaded, and it is desired to reproduce them by the collotype or engraving processes, great care and skill are required on the part of the photographer to get the ground of the negative dense enough to give a perfectly-clean impression in the white parts of the map, and at the same time prevent the grain of the paper from showing and give the faintest tints of the shading their proper value. Coloured maps also give a good deal of trouble, and, when allowable, the colour should be washed off as much as possible before the negatives are taken. Colours may sometimes be removed by chemical means, but there is risk of injury to the original.

Photographic Printing on Sensitive Papers.

The processes under this head may be divided into three classes—

First: Those in which the sensitive papers are prepared with salts of silver and the results are not permanent.

Secondly: Those in which the sensitive papers are prepared with the salts of iron, platinum, and other metals, and the prints, though not absolutely permanent, are more so than silver prints.

Thirdly: Those in which coloured gelatine or other colloid mixed with an alkaline bichromate forms the sensitive surface, and yields prints which, for all practical purposes, may be considered perfectly permanent.

* Continued from page 402.

† See Abney, *Instruction in Photography*, p. 22.

Silver Printing.—Notwithstanding its expensiveness and the want of permanence of the prints, silver printing has hitherto maintained the first place among photographic printing processes, and though very nearly equalled is as yet unsurpassed for the beauty and delicacy of its results. It is the process in most extensive use for producing copies of portraits and views, and, although rapid advances are being made in more permanent methods, it is likely to be a long time before the beautiful but perishable silver print is entirely superseded.

The following brief outline of the operations will be sufficient to show the nature of the process.*

A sheet of paper coated with albumen containing an alkaline chloride, such as common salt, or paper which has merely been immersed in a solution of such salt and dried, is floated on a solution of nitrate of silver and allowed to dry in the dark. It is then placed above the negative in a copying frame, which is so constructed that the light may pass freely through the negative, and at the same time may admit of the examination of the print while the back surface of the sensitive paper is shielded from light. The exposure to light lasts for some minutes, by which the parts unprotected by the denser parts of the negative are darkened more or less, according to its translucency, while the parts entirely shielded from the light remain quite white. When the action of the light is judged sufficient the sensitive paper is removed from the frame in a dark place, and must then undergo an operation of *fixing* to remove the unchanged salts of silver, which would cause the print to darken unless carefully protected from the light. This is effected by steeping the print for a short time in a solution of hyposulphite of soda; but before the print undergoes this indispensable operation it is usual to place it in a solution of chloride of gold, by which part of the reduced silver forming the image is replaced by a film of gold, and the print takes a more agreeable tone, also becoming more permanent than it would be if this operation, called "toning," were omitted. It is, however, impossible to ensure perfect permanency of these prints, by reason of the sulphur contained in the albumen or in traces of sulphur salts formed by the decomposition of the hyposulphite of soda, and left in the print after even the most careful washing, slowly acting on the reduced silver forming the image and converting it into a sulphide, by which the tone and brilliancy of the picture are lost, and the lighter shades appear to fade away entirely. It should, however, be stated that prints prepared on plain, or unalbumenised, paper are more permanent than the albumenised prints, though not so brilliant, sharp, and delicate; and they have the further advantage of being less liable to shrinkage and distortion than the albumenised prints, and are thus more suitable for the reproduction of maps where accuracy of scale is a desideratum.

It is evident that, owing to the expensiveness of the materials used in producing these prints and their want of permanency, together with the slow rate at which they can be produced, this process is almost useless for the reproduction of maps in large numbers; and, in fact, its use in cartography is limited to making copies of special maps for immediate reference or temporary purposes, and as guides for engravers or lithographers in preparing compilations from maps on a larger scale. Silver prints have also been used by engravers to obtain a correct tracing on the waxed surface of their copper plates; but unless these prints are prepared with great care they are open to the objection of becoming distorted and untrue to scale by the contractions and expansions caused by the successive washings they have to undergo. Prints on plain paper are better for this purpose than those on albumenised paper, and prints on paper containing a large proportion of resin in the size are better still.

A very early application of this process has lately been re-introduced in Germany by Herr Romain Talbot, of Berlin, under the title of the "*Lichtpaus* process," with the object of enabling engineers and others to readily prepare a few copies of their plans without the necessity of using a camera and other expensive appliances. In this method a print on a sensitive chlorised paper, prepared with nitrate of silver and an organic acid, so that it may be kept for some time in stock ready for use, is first taken by exposing it to light under the original drawing itself, which to secure the best results should be drawn in very black ink on thin paper or vellum cloth. This print, on which the lines are clear and the ground opaque, is simply fixed in a solution of hyposulphite of soda and then thoroughly washed and dried. A second copy is now made from this negative print in exactly the same way, and as, this time, the lines darken under the clear parts of the negative and the ground remains clear we obtain a perfect transcript of the original. This process is said to be largely used in Germany for copying maps and engineering plans. It is no doubt useful in many cases where it is undesirable or impossible to make more extensive photographic arrangements; but, besides being limited to the reproduction of copies on the same scale as the original, it labours under the disadvantages of expense and want of permanency common to all the silver printing processes.

In the processes just noticed the exposure to light is usually from fifteen to thirty minutes, but in dull weather, or with certain negatives, it may be much longer; it is obvious, therefore, that even under the most favourable conditions comparatively few prints can be produced from a single negative in a day. In order to shorten the exposure and permit prints to be produced with much greater rapidity than with the ordinary process, a method has been introduced by Major Libois, of the Belgian army, by which, instead of the image being produced at once in its full strengh by the action of light, the latter is only allowed to act for a few seconds, and the full effect is produced by treating the print with a developing agent composed principally of gallic acid, which at once reduces the silver in the parts acted on by the light, and thus produces a visible image in place of the almost invisible one formed by the action of the light alone. This process was extensively used in the Depôt de la Guerre, Paris, some years ago, and large numbers of maps were turned out by it, I was told, almost as quickly as they could have been printed in the press, and it had the further advantage that *facsimile* copies could be made of maps from which good results could not have been obtained by photolithography. The same process was used at the Depôt de la Guerre in Brussels, but not on so large a scale. I have also used it with success in India, and it may be recommended in cases where silver printing is required for maps, &c. It is more economical than the ordinary process and much more rapid in working, the exposure being counted by seconds instead of by minutes.

The foregoing are the principal methods of silver printing suitable for cartographic purposes; but, however convenient and useful they may be for special objects where photolithography is not applicable, they cannot be considered adapted for purposes of publication, and their want of permanency is an insuperable defect.

Printing with Salts of Iron.—From time to time attention has been drawn to the possibility of replacing silver printing by processes depending on the use of the salts of iron and other cheap materials; but, though certainly useful in some respects, they have never been brought into extensive practical use.

One of the best known of these processes is the "cyanotype," invented by Sir John Herschel, and lately re-introduced by Messrs. Marion and Co., of Paris, who prepare and supply the ferro-prussiate paper ready for use. Good, even-textured paper is brushed over with a mixture containing nearly equal proportions of ten or twelve per cent. solutions of ammonio-citrate of iron and the ferridcyanide of potassium, dried, and exposed to light under a print or drawing placed with the printed side uppermost. The resulting faint photographic image is developed and fixed by a mere washing in plain water, yielding a print in white or light blue lines on a dark blue ground.

This process is rapid, simple, and cheap. The camera is dispensed with, and the only photographic apparatus required is a printing-frame and one or two dishes or trays. The sensitive paper is easily prepared, and can be kept indefinitely in the dark until required for use. There is no messing with chemicals after the preparation of the paper, pure water only being required to develope and fix the prints. The exposure to the light is very short, two or three minutes in the sun being ample to make a clear, legible copy from a line negative or from a drawing on tracing cloth. The chemicals employed are both very inexpensive.

The objections to the process are two—First, the difficulty of obtaining clear whites; this, however, is of no consequence so long as the details are clearly legible. And, secondly, the colour of the prints—white on a dark blue ground. Although this does not interfere with the practical use of the process for special work, it completely prevents it from being employed as a means of multiplying copies of maps or plans on a large scale. Another defect is the want of sharpness arising from the necessity for placing the reverse side of the original in contact with the sensitive paper in order to get an unreversed print. These objections may be partly obviated by printing from a negative on paper or glass, in which case the lines will be dark blue on a light blue or white ground, but then cameras and other expensive photographic apparatus will be required to produce the negative.

Platinum Printing Process.—There is, however, one process which deserves mention as producing very beautiful and permanent prints, in which the image is formed of reduced platinum. This process has been patented by the inventor, Mr. W. Willis, Jun. Paper is floated on a weak solution of nitrate of silver and dried. It is then brushed over with a solution of double oxalate of potassium and iron, together with a solution of chloro-platinite of potassium. After exposure under a negative the print is floated on a warm solution of oxalate of potash, which causes the platinum salt to be reduced in the parts exposed to the light. The prints are fixed first with hyposulphite of soda, then with oxalate of potash, and finally washed with water.

Collo-Chromate Printing.—We now come to the more important processes depending on the reaction of the salts of chromium, particularly the alkaline bichromates, on gelatine, gum, albumen, and other colloid substances under the influence of light, whereby these substances become more or less insoluble in and unabsorbent of water in proportion to the amount of the action of light, and further acquire the property of taking up greasy ink and not attracting plumbago or other fine dry powder, also, in proportion to the amount of the action of light upon them.

This simple reaction, only partially discovered in 1839 by Mungo Ponton, was first worked out and turned to practical account some twelve years afterwards by Fox Talbot in his process of photoglyphic engraving; and after him Pretsch and, notably, Poitevin employed it in processes which have been the foundation of nearly all the modern methods of permanent photographic printing.

* For details see Abney's *Instruction in Photography*, p. 113.

The simplest of all these processes, and one which may render useful service in the cases already noticed where only a few copies are required, was one of the first published by Poitevin. It consists in coating paper with a mixture of albumen, gum, or gelatine and bichromate of potash, coloured with Indian ink or any other suitable pigment; or, if preferred, the paper may be coated with coloured gelatine and then made sensitive in a separate bath of bichromate of potash, and this is sometimes the best method, because the paper will not keep good for long in its sensitive state. The sensitive coloured paper is exposed under a very clear line negative in a copying frame for a few minutes, and then taken out and plunged into water, either hot or cold, according as gelatine, gum, or albumen has been used. The unaltered colloid in the lights of the print, which have been protected from the light under the dark parts of the negative, dissolves in the water, leaving a clear image in pigment on a white ground.

This simple method is capable of extensive use in copying maps or topographical sketches, but is only applicable to subjects in line, well drawn in black and white in accordance with the rules in section iii. These prints have the advantage of being quite permanent; and, as the collo-chromate mixture is more sensitive to light than the chloride of silver, they can be produced at a quicker rate than the silver prints, and are, of course, cheaper on account of the inexpensiveness of the materials used.

For reproducing subjects in half-tones a different procedure must be followed. In the process just described the exposure to light and the development of the print by washing are effected on the coloured side of the paper; and, as the light can act with full power through the clear spaces on the negative representing the lines of the subject, it renders the colloid coating insoluble throughout the thickness of the coloured film, so that the lines withstand the solvent action of the warm water, which entirely removes the rest of the coloured film from the ground and parts which have not been influenced at all by the light. If, however, instead of a negative of a line subject, on which the lines are transparent and the ground opaque, we take a negative of a subject in half-tones, possessing various degrees of translucency in the lights and shadows of the picture, and make a print from it on a piece of the pigmented paper, we shall find that the light will only be able to penetrate through the entire thickness of the colloid film in the deepest shadows, represented, as before, by nearly clear glass. In the darker half-tones it will penetrate nearly through the coating, in the middle tones about half-way through, and in the lightest tones the light will be able to act only on the surface of the gelatine. We shall, therefore, have a print with an insoluble surface of varying depth, and underlying this a more or less soluble layer; it will thus readily be understood that when exposed to the action of warm water this layer will dissolve and carry away with it the partially insoluble surface film forming the half-shades of the picture, leaving only the stronger shades, and giving a rough, hard, and unfinished appearance to the print.

For a long time this difficulty proved a stumbling-block in the way of the progress of permanent printing, and gave the silver-printing processes a supremacy of which it has now become difficult to deprive them. The Abbé Laborde was the first to see the necessity for adopting the principle of exposing on one side and developing on the other. Blair, Fargier, and Swan applied this to the carbon process, and the latter finally succeeded in introducing a practical method of pigment printing applicable to the same class of subjects as silver printing. Swan prepared a tissue by coating paper with a thick layer of gelatine mixed with bichromate of potash, and coloured with any suitable pigment. After the exposure to light the gelatinous surface of the tissue was caused to adhere closely to a second piece of paper coated with india-rubber. The whole being immersed in hot water, the paper on which the gelatinous layer was originally supported became loosened and could be removed, allowing the hot water to gradually dissolve away the unaltered and soluble gelatine. In this manner the exposure to light takes place on one side of the gelatine film, while the washing away of the superfluous gelatine is effected from the other, or unexposed, side without disturbing in any way the exposed parts of the film, and thus the most delicate shades in the half-tones are perfectly preserved. Since its introduction by Swan this process has been much improved by Messrs. J. R. Johnson, J. R. Sawyer, and other members of the London Autotype Company, which acquired Swan's patents, and under the name of the "autotype" process it has been worked on a large commercial scale for the reproduction of works of art, and is now fairly beginning to come into active competition with silver printing for all ordinary purposes of portrait and landscape photography.

The following is an outline of the operations as now practised by the Autotype Company.*

The pigment tissue is prepared by coating long bands of paper with a moderately-thick layer of gelatine coloured with any suitable pigment, and is sold ready for use either in an insensitive or sensitive condition.

The tissue is sensitised by immersion for a minute or two in a five-per-cent. solution of bichromate of potash in water, to which some alcohol may be added with advantage, especially in hot climates; the bath should also be cooled down with ice if its temperature exceed 65°. The tissue is then carefully dried, and when dry is ready to be exposed under the negative. This is done in a printing-frame in the usual way, the only precaution necessary being to paste slips of thin grey paper round the edges of the negative, so as to cut off a great portion of the light and form what is called the "safe edge." As the tissue generally appears black all over, the progress of the printing cannot be ascertained by inspection, and it is necessary to use a little instrument called an "actinometer," by means of which the degree of exposure necessary for any negative having been once ascertained, it is easy to give the same amount of exposure to successive prints. Up to this point the operations are the same whatever may be the nature of the support upon which the picture finally rests. The subsequent operations, however, differ accordingly as the image is developed on a final support by what is called the "single transfer" method, or on a temporary support by the "double transfer" method. In any case some support is indispensable to retain the image and preserve it from injury during the washing.

In the single transfer process the support is paper coated with a gelatinous substance, which, though insoluble in water, retains sufficient adhesive power when moistened to enable it to hold the picture during development and afterwards permanently.

After exposure under the negative the pigmented tissue, having been immersed in cold water, together with a piece of the transfer paper, the two surfaces are applied to one another under water, and both drawn out together. They are then laid on a zinc plate, tissue uppermost, and brought into close contact, all intervening air being driven out by means of an india-rubber scraper, or "squeegee," which also removes all superfluous moisture. The prints and support are allowed to remain together for a short time, and are then immersed in warm water. After a little while the soluble gelatine will soften and become partially dissolved, when the paper forming the original support of the layer of gelatine may be gently removed, leaving a dark, slimy-looking mass on the transfer paper. The soluble gelatine gradually clears away by the action of the hot water, and reveals the image in more or less perfection of details according as the exposure has been properly timed. When fully developed the print is washed with cold water, then passed through a solution of alum, rinsed again with water, and allowed to dry.

Instead of paper any other suitable permanent support may be used; but whatever the support may be a reversed negative must be used if it be desired to obtain non-inverted pictures by the single transfer method.

When it is inconvenient to use a reversed negative, and it is desired to obtain a non-inverted picture, the development of the tissue prints must be conducted by the double transfer method upon a temporary support, either rigid or flexible. The discovery that the pigment pictures might be developed upon any impermeable surface is due to Mr. J. R. Johnson, who also found that if such surface previously receive a coating of some fatty or resinous compound the picture may be transferred, after development, to a final support.

The most suitable surface for the temporary support is a sheet of zinc, which may be either polished or grained; opal glass or porcelain plates may also be used with advantage.

The plate employed as the temporary support first receives a coating of a solution of wax and resin in turpentine, and some operators coat the plate with collodion after the waxing in order to improve the surface. The pigment tissue carrying the image is attached to the support under water in much the same way as in the single transfer method, and after remaining for a time is developed in the same way and allowed to dry. The plate with the picture on it is then rinsed in water, and a piece of what is called "double transfer paper"—a fine paper coated with an enamel surface—having been soaked in water till quite soft is laid on the wet plate, avoiding air-bubbles, and pressed into perfect contact with it by means of the india-rubber scraper. The picture with the transfer paper attached is now dried carefully, and when dry separates of itself from the temporary support.

Mr. J. R. Sawyer, of the Autotype Company, has introduced a flexible support, consisting of paper coated with a solution of gelatine rendered insoluble with chrome alum. When dry this is coated again with an alkaline solution of shellac, dried, and well rolled under powerful pressure; it is afterwards coated with a waxing compound. The use of this flexible support is said to be advantageous with small pictures, but I have not found it answer very well in this country.

All these operations, which seem so complicated, are in reality very simple, and as the sensitised tissue is very sensitive to light a great many prints can be produced in a single day. The number may, moreover, be increased by a plan proposed by Captain Abney, R.E., of exposing the print for only half the usual time and then letting it lie by in the dark for some hours. The decomposing action set up by the light goes on in the darkness, and on development a picture is produced quite as good as if it had received a full amount of exposure and been developed at once. This discovery is largely utilised by those working the process in England, and enables an amount of work to be done in the winter months which would otherwise be impossible.

The pigment prints are perfectly permanent for all practical purposes, and, though they may under certain circumstances change colour slightly or lose their brilliancy, there is no such absolute fading and loss of details as in silver prints. The process may be applied in all cases to replace silver printing where permanency of results is an object. As

* See the *Autotype Process*, 6th edition. Also Simpson's, Monckhoven's, Vidal's, and Liesegang's treatises on carbon printing.

I have mentioned before, the process is not quite suitable for the reproduction of coloured or shaded maps, owing to difficulties in obtaining prints comprising large surfaces of clean white paper, together with the delicate half-tones of hill-shading. For maps in line the simple carbon process is more suitable, or, if many copies are required, photozincography would be better. J. WATERHOUSE, *Capt.*

(To be continued.)

Our Editorial Table.

PRACTICAL PORTRAIT PHOTOGRAPHY. By WILLIAM HEIGHWAY. London: PIPER AND CARTER.

THIS manual is, what it purports to be, a treatise on *portrait* photography—a department on the requirements of which Mr. Heighway seems to have bestowed much attention. The various manipulations are carefully described. On the subject of weak and strong iron developers Mr. Heighway says:—

"The effect of a strong developer is to reduce intensity, making the image appear thin, and lacking sufficient contrast; while a too weak developer brings the image out slowly and too intensely in the high lights, leaving the shadows comparatively bare. Another effect of a developer of this character is that the reduction set in motion by it is so slow that the shadows become fogged before the lights are sufficiently brought out; and the same effect is caused by a strong developer, because the reduction of silver is too rapid to be properly watched, so that before the developer can be washed off the silver has been deposited on all parts of the negative, giving the shadows a misty, veiled appearance."

Recognising the unfortunate fact that among portrait photographers are occasionally to be found some who are rude and unmannerly—whose every word, gesture, and action produce a discordant and worrying effect on the unfortunate sitter who has submitted herself or himself to the tender mercies of such a boor—Mr. Heighway is of opinion that those who, while not belonging to the above category, but are possessed of an unsympathetic nature fatal to the obtaining of a good expression, may, to a great extent, overcome that cause of non-success by feeling and expressing an interest in, and consideration for, the sitter which will in most cases call forth a corresponding feeling. "There is no formula," says Mr. Heighway, "for making *expression*, but by observing those simple rules of kindliness, courtesy, and consideration very much may be done to set people who visit photographic galleries at their ease, and to lighten to a considerable extent your own trials."

In this work the practical character is kept up to the very last, the concluding chapter being devoted to the reception-room. We here find many useful hints in connection with business matters, such as "appointments," "resittings," and suggestions as to the treatment of sitters. This manual, which has reached a second edition, is replete with useful matter to photographers.

EXAMPLES OF SUBTERRANEAN PHOTOGRAPHY. By WILLIAM BROOKS.

IT is several weeks since we were made aware that Mr. Brooks had undertaken and successfully accomplished the extremely difficult task of taking photographs of the interior of a number of caves in Reigate, situated at a depth of about sixty feet below the surface of the earth. These caves are in the possession of a wine and spirit merchant, by whom they are used as vaults in which to store the various liquors he dispenses.

In the early part of this summer the occupant, Mr. Charles Mead, conceived the desirability of having a series of photographs of these caves taken, and for this purpose consulted Mr. Brooks, who, after several trials and overcoming numerous difficulties, eventually succeeded in obtaining eight fine negatives, from which have been printed, by the Woodbury Company, the examples now before us.

The source of illumination of the caves, the sides of which are encrusted with a greenish-black, slimy matter, was a collection of paraffine lamps. These were of the kind in common use, costing eighteenpence each. Sixteen of these lamps were employed. In the course of the preliminary experiments the lime light was made use of, but it was not found to possess advantages equal to the paraffine lamps, which, when in use, were arranged and distributed so as to illuminate the place evenly, without the lamps themselves being seen. The plates used were gelatine emulsion plates, respectively of the Kennett and Bennett "brands," supplemented by some prepared by Mr. Brooks himself. The lens was a stereoscopic portrait combination, employed with its full aperture, the exposures given varying from one to five hours for each picture. The negatives having been obtained, transparencies were then produced from them by means of collodion emulsion, care being taken to ensure the greatest possible uniformity in regard to the density; for the series of transparencies thus obtained were mounted in juxtaposition, and in this state served to produce a negative of the whole on one plate, from which were printed, in Woodburytype, the eight subterranean views.

The difficult task we have described has been most successfully accomplished by Mr. Brooks; nor must a meed of praise be omitted to be awarded to the Woodbury Company for the excellent manner in which the views have been printed—eight on one sheet.

Correspondence.

GLASS STEREOSCOPIC TRANSPARENCIES.

To the EDITORS.

GENTLEMEN,—In respect to the reply of Mr. S. H. Oakes to my article (which appeared in your issue of August 16th), I beg to inform that gentleman that if he read it once more he will find it was written for the benefit of those who object to cut their negatives in half and transpose them before producing the transparency, or having to make two exposures, which, of course, entails extra apparatus. Cutting the negatives has always been a stumbling-block with many, both professional and amateur, and therefore I contend that the information given in my communication supplies that long-felt want, whatever may be the disadvantages Mr. Oakes may see in it.

He says he has a more lengthy communication on the same subject, which, I presume, he thinks is certain to be better than mine. I hope it may be. In journalism it is always very difficult to write upon any subject without some one finding fault with it. That, in a sense, I do not object to, but I should like to know in this case what are the disadvantages to which he objects. I cannot help thinking that in the reply of Mr. Oakes there is something of narrow-mindedness displayed, as he appears to play the parts of judge and jury.

I gather from the third paragraph of Mr. Oakes's letter that he thinks it unnecessary to make the transparency on glass. For myself I have not found a better substitute. There are now plenty of those French paper transparent slides in the market which will not bear comparison with those made on glass. In respect to turning a glass transparency out to be sold to an appreciative public at a shilling, I think that would be going to the extreme, and I do not think that any manufacturer could be able to turn them out fast enough before the bankruptcy court put a stop to it. I think if a good slide were made to sell at (say) two shillings, or, at the outside, half-a-crown, a manufacturer with divided labour would meet with a fair amount of support that would pay him and command a steady sale.

Whatever I write in regard to photography I give the result of my experiments for the benefit and progress of whom it may concern. For the past two years I have scarcely been able to rank myself as a professional photographer owing to ill health, but have engaged myself more in experimental work, and some of the results I have made known through the medium of the South London Photographic Society and the photographic press.—I am, yours, &c., WM. BROOKS.

Reigate, Surrey, August 24, 1878.

POLYTECHNIC EXHIBITION, FALMOUTH.—We have been informed by the Secretary that in consequence of the large number of photographs exhibited at the present exhibition the awards were not completed in time to be reported in this week's issue, but will be given in our next number.

SUGGESTED TAX ON PHOTOGRAPHS.—I understand that Sir Stafford Northcote has had it suggested to him by a "financial adviser" that if next session he finds it necessary to impose any new taxes he ought to increase the duty on tobacco and impose a stamp duty on photographs. This latter tax ought not to be unpopular, and it cannot fail to be remunerative. Nobody will sympathise with the grievance of the "cad" if, when he buys a *carte* of Mrs. Langtry or Mrs. Cornwallis West, in order that he and his friends may gloat over these fashionable beauties, he is mulcted for the benefit of the State. A tax on photographs is, to a large extent, a tax on vanity and "snobbery," and for fiscal purposes these foibles are surely fair "game."—*Mayfair.*

THE PROGRESS OF POIKILOGRAPHY.—It is a year since we directed attention to some excellent reproductions of oil paintings in *facsimile* executed by means of a process in which photography, aided by oil pigments, was employed so as to produce copies of works of art that could not be distinguished from the original paintings. Since the time of the appearance of that notice Signor Lombardi—under whose fostering care and skilful treatment the process of "poikilography" has been introduced so successfully—has made still further improvements, by which, to the beauties originally inherent in these pictorial treasures, are now added the further advantages of their being produced upon the canvas or other textile fabric desired in permanent pigments. The securing of this end without the sacrifice of other good qualities has been effected only after a long course of experiments, in which difficulties have been encountered only to be successfully overcome. We have already published the chief details of the process of poikilography; the nature of the most recent improvements we cannot yet divulge for several weeks until in due course of time we are enabled to do so by the operation of the patent law under which protection has been granted for the invention. In the meantime we are empowered to freely invite our readers to visit the collection of poikilographs now on view in Signor Lombardi's galleries, Pall Mall East, in order that each may judge for himself the nature of the improvements recently effected.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A first-class burnisher will be given in exchange for a good retouching desk.—Address, J. Stead, photographer, Northallerton, Yorkshire.

ANSWERS TO CORRESPONDENTS.

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

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

Devoniensis.—A rectangular prism will not reflect light into a lens possessing even a moderate width of angle, unless the back is silvered.

Constant Reader.—The American Company are said to produce their admirable phototypic blocks for surface printing by the Leggotype process, the details of which will be found in one of our previous volumes.

Silber.—1. A *mètre* contains one yard and three and three-quarter inches of our English measurement.—2. It would be somewhat impracticable to compile and publish such a directory as you propose, as the time is not yet ripe for it.

J. (Aldershot).—Your idea is scarcely new, for about ten years ago we published a suggestion made by one of our correspondents to the effect that a developing agent might be applied to the plate coated with bromised emulsion previous to its exposure to light, the formation of the image being watched through a hood.

Astronomicus—The telescope to which we alluded as now being in course of construction is a *refractor*, the object glass being twenty-seven inches in diameter. The Melbourne telescope is a *reflector*, the speculum of which is four feet in diameter. From this you will see that there is no inconsistency in our observation.

H. J. R.—Dry plates are not required for the purpose mentioned by you, namely, securing negatives of the houses and scenes in the locality in which you reside. A wet collodion plate, if carefully prepared, well drained, and placed in a tightly-fitting dark slide, will keep quite good for all the time you require it to do so.

M. D.—Thanks for enclosing the cutting, which we have read attentively. It is one of the strangest jumbles of science and absurdity which we have ever perused. The writer must have penned it when he was under the simultaneous influence of science, a desire for penny-a-lining, and some fluid stimulant of a much stronger nature than either tea or coffee.

Auld Reekie.—While denying the premisses *in toto* we quite accept the conclusion; for the experiment recorded is within our own range of experience. What we object to is your method of accounting for it. The subject is one which you had better discuss in the pages of the *Spiritualist* or *Medium*—weekly journals devoted to topics connected with psychology.

George Hogg—The kind of phosphorus known as "*Bolognian*" is the most effective for producing phosphorescent photographs. Make into a paste a mixture of sulphate of barytes and a solution of gum tragacanth; then place it in a crucible, which must be covered and exposed for half an hour to a very strong degree of heat. A whitish product is obtained, which is the phosphorus in question. It must be reduced to a fine powder and carefully preserved in a well-stoppered bottle.

W. Fisher, Jun.—There is no distortion, viewing the question from the prospective point of view, nor is there any want of truth, mathematically speaking, in a portrait obtained under the circumstances recorded. But, viewed from quite a very different standpoint, there is both distortion and want of truth in the same picture, because it conveys to the spectator an idea entirely at variance with truth. The boulder weighing only four pounds is simply made to "tell a lie" when it is introduced into a photograph under such circumstances as to convey the idea of its being a rock of the height of thirty or forty feet. Respectable photographers should never lend themselves to tricks like this, by which the art is degraded.

W. W.—We hope to be in a position soon to publish valuable information resulting from the observations of the recent eclipse. This, however, will scarcely meet your difficulty, which must remain unsolved for another century or two, we fear.

J. W. B.—A gelatine emulsion may have its soluble salts removed either by the means described by Messrs. Wratten and Wainwright in our last Almanac or by forcing through one of those syringes which have been introduced for effecting the removal of salt from butter. The congealed, although not dried, gelatine is placed inside the cylinder, and the piston being then forced down upon it causes the emulsion to emanate from the holes in the end of the instrument in vermicular forms. This is received in plain cold water.

Geo. Ross.—Major Russell's *quick* tannin process will certainly answer the purpose better than any of those you mention. We cannot here give more than an outline of that process:—Let the collodion contain eight grains (to the ounce) of bromide of cadmium; excite the plate in a sixty-grain bath for at least a quarter of an hour, wash thoroughly, and then apply a ten-grain solution of tannin, which must afterwards be removed by washing when dry. The exposure required is rather less than that necessary to be given to a wet collodion plate, it being of course understood that the image is to be developed with alkaline pyro.

G. P. B.—To prepare ox-gall try the following:—Procure from a butcher half-a-pint of the gall, place it in a clean saucepan and add one ounce each of common salt and powdered alum. Place it over a fire, and when it boils remove it for half-an-hour to cool; then boil again, and repeat this boiling and cooling three or four times. After this allow it to settle for four hours and decant off into a bottle, into which put a few drops of essence of lemon; cork and preserve for use. Our correspondent's inquiry has relation to the "best" mode of preparing ox-gall, and we give the foregoing as the best of which we are at present aware. Should any reader know of a better we shall be glad to have it communicated.

A. E. D.—This correspondent's occupation as an artist in a photographic establishment enables him to overhear the conversation which goes on in the studio, and he is of opinion that it would be both amusing and interesting if those who know the pet expressions of operators to the sitters when about to "expose" would send them for publication. "My experience," he observes, "in this matter is that each man has a favourite expression which he repeats to each sitter; and, even if he take a brother operator, he, through force of habit, still gives the final warning to 'keep quite still,' or (as one principal of an establishment used to say) 'now, perfectly rigid'—an expression devoid of artistic association. The operator, I now hear, does not warn sitters when the exposure is to take place, but tells them he will let them know when it is done! Another whom I remember always said "now, do try and look a little more miserable!' and behold a grin was evoked. Another conversation I overheard between two operators about testing the strength of a nitrate of silver bath. One said the argentometer was a fair test for indicating the strength of an *old* bath. The other disagreed, saying that the ether and alcohol interfered with the argentometer giving a true register of the strength. Whether true or not I should think if it registered as low as ten grains to the ounce there could be no doubt about its wanting replenishing." After reciting other instances of overheard conversations, our correspondent concludes by again asserting that great interest would be felt if those competent to do so would collate and report such expressions. We shall gladly receive such.

Received.—Draper's *Scientific Memoirs.*

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Sept. 2 ……..	West Riding of Yorkshire ….	Oddfellows' Hall, Bradford.
,, 4 ……..	Edinburgh …………………	Hall, 5, St. Andrew-square.
,, 4 ……..	Bristol and W. of Eng. Amateur	Museum, Queen's-road.
,, 4 ……..	Photographers' Benevolent ….	160a, Aldersgate-street.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For the Week ending August 28, 1878.

These Observations are Taken at 8.30 a.m.

August.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
22	29·97	99	71	57	59	64	E	Cloudy
23	29·54	81	68	59	62	63	SE	Cloudy
24	29·42	95	68	59	60	63	NE	Cloudy
26	29·49	95	71	55	59	62	W	Clear
27	29·67	105	72	59	61	64	SW	Raining
28	29·75	109	72	57	60	64	WSW	Cloudy

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 957. Vol. XXV.—SEPTEMBER 6, 1878.

ON THE ALLEGED ADVANTAGES OF PRELIMINARY EXPOSURES.

It will be remembered that a few weeks ago, in our number for July 12th, we had occasion to refer to the alleged increase of sensitiveness obtained by a brief preliminary exposure of silvered paper to the light previous to its being placed in the printing-frame. Some little ambiguity exists as to whether the gain claimed is actually a general increase of sensitiveness, or whether it consists only in obtaining, as Mr. A. M. de Silva states the case in *Anthony's Photographic Bulletin*, *more detail in the lights.* We are also in doubt as to whether the writer, in speaking of "tinting" the paper, intends to convey that an actual discolouration is to be produced by the pre-exposure or whether the latter is to be so brief as to produce no visible effect. However that may be, the remarks we made at the time referred to, and based upon a *literal* repetition of Mr. de Silva's experiments, showed that we had been unable to reproduce the effects obtained by that gentleman.

Since then, however, an accidental circumstance arose which led us back to somewhat similar experiments in a modified form, and the results were such as justify us in recurring to the subject, more especially as we are unwilling to condemn, through a misconception, what may possibly be not only theoretically correct but also practically useful. In describing the new experiments we shall endeavour to point out where the misconceptions and ambiguities have arisen to produce such a variety of opinions as exist upon the alleged efficacy of pre-exposures.

The circumstance to which we have alluded occurred in the course of some trials of the printing qualities of three or four different descriptions of sensitive paper. These were exposed, side by side, under a rough sort of actinometer scale, formed by the superposition of various thicknesses of fine-grained paper, and it was noticed on one occasion that after exposure for a whole day a certain number of tints had become visible upon each sample of paper under trial; and, further, that during nearly one-half of the time of exposure the only change that had taken place was in the gradual strengthening of the tints already impressed, no fresh ones becoming visible. From this we inferred that the limit of actinic transparency had been reached, and that the light was incapable of penetrating through a greater number of thicknesses of the paper composing the scale.

Judge of our surprise, then, when upon again exposing the frame next morning one of the samples of paper within an hour showed a new tint, and in the course of the day each of the others successively followed suit. It was very obvious that the strength of the light could not have varied to such an extent as to enable it to penetrate in a single hour a thickness of semi-opaque material which had perfectly resisted its action during a whole day. It might certainly be so under some circumstances, but in this case both days were bright and sunny; in fact, as nearly equal in actinic power as it is possible for two consecutive summer days to be.

The only conclusion we could arrive at was that the previous day's exposure had had its share in the effect; that, in fact, an invisible action, occupying an appreciable time, must take place before the visible impression is produced. Looking at the facts in the most straightforward manner, it is impossible to deny the justice of so much of the theory involved; for, were it not so, the immediate—nay, instantaneous—effect upon exposing a piece of sensitive paper to daylight behind a negative would be the production of a faint image in all its details. Against this it may be urged that light requires an appreciable time to penetrate even so transparent a medium as the atmosphere, and that, therefore, the varying density of the details of the negative would retard its progress and so cause the gradual appearance of the different portions of the picture. But, even granting the truth of that, we have to get over the fact that a piece of silvered paper entirely devoid of visible image is capable of producing one under development, showing clearly that an invisible action has really taken place.

In order to test the matter in a practical manner we constructed a scale of only four "tints," composed of one, two, three, and four thicknesses respectively of the same paper employed previously. We found by experiment that the approximate exposures necessary to colour the paper under each of the tints were fifty seconds, two minutes, six minutes, and twenty-one minutes. A strip of sensitive paper was now exposed for fifteen minutes under four thicknesses of the same paper used for the scale, or, in other words, it received something less than three-quarters of the exposure necessary to produce a visible discolouration under those circumstances of lighting. It was then placed side by side with another strip of unsunned silver paper in the four-tint actinometer and exposed; for the sake of clearness in describing the results we will designate the exposed strip *a* and the unexposed *b*.

After thirty seconds' exposure *a* showed the first tint clearly, in one minute the second also very distinctly, while *b* gave the first faintly. In a minute and a-half no further change beyond a strengthening of the tints was noticeable; but two minutes produced the third tint on *a* and the second upon *b*—the latter very faintly. Up to five minutes' exposure no fresh tints appeared, and at this point there was scarcely any difference to be detected between the first tints upon the two slips; but No. 2 was distinctly stronger upon *a* than the corresponding one on *b*, at six minutes No. 3 was feebly shown upon *b*, and seven minutes brought out the fourth and last upon *a*, *b* remaining perfectly uncoloured.

We make no apology for thus minutely describing this simple operation, but ask our readers to study it carefully, as it contains, to our mind, a very plain exposition of the action and effect of the preliminary exposure. We expose simultaneously two strips of sensitive paper, each perfectly uncoloured, and at the end of seven minutes the most feebly-illuminated end of one of them shows a result which the other would have required an exposure *three times as long* to produce, while at the same time the action at the better-lighted end is practically identical in each case. This agrees entirely with Mr. de Silva's experience in obtaining a tint through his yellow paper mask upon the sunned paper while the unexposed part remained clear, and we may now say a word or two upon the discrepancies between these results and our former ones.

In the first place we previously followed that gentleman's instructions literally, and slightly tinted the paper *visibly* by direct exposure to the light. Now we are of opinion from the above experiment (and others of so similar a character that they are not worth recapitulation) that so soon as visible discolouration commences any advantage otherwise obtainable is lost. The only object of the auxiliary exposure is to set in motion and *nearly*, but not quite, complete the invisible change, and so render the paper more sensitive to feeble rays. The effect is simply to accelerate the starting power (if we may so term it) of the visible action, which, when it once commences, proceeds with equal rapidity upon the sunned or unsunned paper, and in proportion as the exposure is prolonged so does the advantage accruing to the feebly-lighted tints gradually disappear. In the experiment previously quoted, with an equal depth of tint in the lower shades the highest grade on the scale is reached in one-third of the time upon the pre-exposed paper; but so slowly does the visible action progress under the four thicknesses of paper that after half-an-hour's exposure little, if any, difference is noticeable between any of the tints on the separate papers.

It will, of course, be understood that in employing a scale of four widely-distinct tints, as we have done, the effect will be far more pronounced than if the delicate gradations of a negative were in question; but, at the same time, it is plain that in the case of a very dense negative, provided that detail exists in the high lights, there will be a chance of bringing it out without bronzing the shadows or over-printing the half-tones. The function of pre-exposure, whether applied to paper or to a film in the camera, is the production of more detail with a given exposure; in the case of printing, at least, it is a misnomer to call it an increase of sensitiveness, for the time required to produce the necessary depth of reduced silver in the shadows will not be appreciably reduced. In a camera exposure the conditions are altered; the necessary depth of deposit can easily be obtained in the lights if only the feeble details can be brought within the scope of the developer, and in this connection the result may be practically a reduction of the exposure necessary to produce a certain result.

Theory and practice, it is needless to say, are two very different things; and while we are ready to uphold the correctness of the principle of auxiliary exposures, we do not for one moment believe or wish others to believe that the advantages are to be attained without a good deal of care and judgment. We know how widely authorities differ as to the utility of the various "dodges" and patents which have appeared, such as coloured glass in the camera, translucent caps for the lens, exposure of the plate to the flame of a candle, and sunning the paper (or "dashing" it, as Mr. de Silva is pleased to call it). We are ready to believe that where one man fails with all or any of these methods another may succeed; it is merely a matter of comparative skill and thought in carrying out the details of *the principle*. "Judicious fogging" is one of its epigrammatic designations, but "fog" means a general reduction over the whole surface of the plate, which is certainly not the case if the auxiliary exposure be carefully and properly applied. Following Dr. Spottiswoode's suggestion, we might, did time permit, enter into a mathematical discussion of the problem, and prove that the gain is in inverse proportion to the actinic value of the gradations of the picture; that, in fact, it is greatest where it is most needed—in the deepest shadows.

A NEW MATERIAL FOR BACKGROUNDS.

No matter how fine may be a photographic portrait, no matter how exquisite its modelling or how perfect its *chiaroscuro*, if the background of such a portrait be bad the eye cannot readily appreciate the points of excellence in presence of the defect. Many an otherwise fine portrait has been condemned by the *cognoscenti* or rejected by the client on account of spots, patchiness, or inartistic inequalities in the background—defects which it is impossible to remove save by the expenditure of much labour on the part of the retoucher. Nor are these defects due solely to slovenly manipulation; for in the majority of cases they are found to be attributable to the exceedingly imperfect backgrounds to be found in so many studios.

Without implying aught save the highest degree of skill on the part of the manufacturers of backgrounds at home, it still must be admitted that an incentive to further efforts in this branch of manufacture has recently been given by the importation of "grounds" of transatlantic preparation, in the adornment of which imitative art has been laid under contribution to a very great extent.

We always are, and ever have been, most ready to gladly acknowledge every improvement—whether in the æsthetics, the chemistry, the practice, or the mechanics of photography—with which we have been favoured from America; and in this spirit we acknowledge a matter which, although belonging to what some may consider the less important things of photography, yet is, in our estimation, destined to exercise an important influence for good. It belongs to the category of studio appurtenances, and which may be pressed into photographic service, doing double duty, namely, as a blind and as a background. It is in the latter capacity that we speak of it at present.

From Messrs. J. Avery and Co., the well-known window-blind manufacturers, Great Portland-street, we have received several samples of an American material entitled "The Empire Patent Cloth." This material was originally prepared (under a patent to which reference will be made hereafter) for the purposes of window blinds; but it was soon discovered by a sharp photographer that it possessed exceptional value as an article to use for backgrounds. The material is a textile fabric—not very thick, but exceedingly pliant. Its surfaces are prepared in such a manner as to render almost invisible the meshes of which the fabric is composed, which is the point that chiefly concerns photographers—the surface being both quite dead (in the sense of its being matt or non-reflecting) and also possessing a singular uniformity of colour. These qualities testify to its being, *par excellence*, a material suitable for plain backgrounds.

In the collection of samples with which Messrs. Avery and Co. have favoured us we recognise no fewer than twelve distinct varieties of colour, a large number of which are suitable for backgrounds, some being, of course, much more so than others; and we have been informed by the principal of the firm that it is quite easy to prepare the fabric so that each side shall be of a different colour.

Upon subjecting larger samples to the practical test of being photographed they amply bear out all our anticipations, the effect produced being very excellent.

It might be thought that in accordance with our custom when treating of patented articles we should here give details of the manner in which the fabric is prepared. This will follow in due course; but, meanwhile, we may state that a benzole varnish being employed as the menstruum in which the pigment is contained water does not appear to produce any deleterious effect upon the fabric. Among photographers the material will, undoubtedly, meet with a hearty welcome.

COPYING OIL PAINTINGS.

In treating of this subject last week we broke off our instructions at the point where the due lighting of the canvas was under consideration—a subject of primary importance, no amount of skill and attention, even with the use of the most complete apparatus, being able to counteract the effects of improper illumination. We have laid down as a practical canon that "the nearer the illuminating area lies towards the edge of the picture the more is its reflection thrown away from the lens." And this will be found the best method of allowing the light to fall upon the picture, sufficient allowance being made for the respective sizes of picture and skylight. Thus, for instance, it would clearly be wrong to have only a portion of the lights uncovered a few feet wide with a picture ten or twelve feet long.

To give an example of the mode of illumination we recommend we will suppose a picture is firmly arranged in its place in the studio and focussed accurately, which may be done with the full aperture and all the skylight uncovered. Upon looking at it, standing immediately in front of the camera, we should possibly see a mass of glare and light which would quite obscure the details of the picture even to the eye; far more would it do so when photographed. If, now, the blinds be gradually covered over so as to leave only about two or three feet in advance of the picture for the light to come through, a magical effect will be produced. All the glare will disappear, and from corner to corner the picture will be visible, and will photograph equally well, excepting, of course, that want of accordance in the scale of colours which we are always familiar with.

The next step—the exposure required—is one of some little difficulty, as it is obvious that the less the light employed the greater the difficulty in giving sufficient exposure to the plate and in obtaining density. Some old pictures throw off so little actinic light that the exposure needed may be an hour or more, and they are the more difficult seeing that, as a rule, the older they are the more uneven is their surface, requiring in consequence the greatest restraint in lighting. But with careful and well-judged timing a negative of fair intensity will be obtained with the most difficult picture. As much density as possible should be obtained without forcing it before fixing, and then a judgment can be formed as to the process to be employed for intensification; but we must here say that it is only in rare cases that it need be resorted to. In nineteen cases out of twenty any picture brought to the studio should photograph so as to give a negative requiring no intensifying after fixing, a little extra pyro. and silver only being required before the application of the hypo., which should always be used in preference to cyanide, the latter having a tendency to reduce intensity in some cases. When sufficient printing density has not, however, been obtained the negative should be well washed and pyro. and silver used. If the negative be very weak it may be preceded by a wash of iodine in water about the colour of sherry. In a case so exceptional that none of these expedients give sufficient density Schlippe's salt may be used, or, indeed, any of what may be called the special intensifiers with whose action the operator is most familiar.

In cases where the picture cannot be removed the lighting is often entirely of a fixed nature, and very little under any control; but even then it will usually happen that there will be one or more windows whose light *must* be screened to avoid reflections. The rule we have laid down may be brought to bear in forming a judgment in such cases. Mirrors, too, may have to be made use of again, but placed much at one side of the picture.

It will frequently happen that the canvas is covered over with a sort of milky-looking film. This must be removed or mitigated before beginning operations, or it will fog and destroy the brilliancy of every negative, whatever exposure be given. It may arise from three causes:—First, a deposit which gradually accumulates upon all surfaces in dwelling-houses when they are not kept clean by friction, &c.; secondly, from a gradual change of their surface which some varnishes undergo in course of time; and, thirdly, from an improper application of the varnish in the first instance, which causes the effect to be seen at once.

The first effect may easily be remedied by sponging with clear cold water, followed by gentle rubbing with a clean dry cloth, the picture after this simple process being sometimes wonderfully improved. The second defect should only be temporarily cured by the photographer, who, of course, would not think for a moment of varnishing a painting entrusted to him. But if the picture be free from cracks he may put a few drops of nut oil upon its surface, and gently smear it all over by means of a rolled-up piece of linen, gently rubbing it over till a mere trace is left behind. This will not injure the picture, and for the time will cause it to present the appearance of a recently-executed painting, in which state it will photograph very easily. The whole can then be removed by one or two perfectly dry cloths, and the picture be none the worse for the operation. This last plan is best put in force after the picture has been sponged and dried. The third defect we have named can only be cured by removal of the varnish and revarnishing by an experienced picture cleaner.

In conclusion: we would say that beyond the simple methods we have pointed out no tampering whatever should be attempted with any picture entrusted to the photographer for copying, as incalculable damage may easily be done through apparently the simplest treatment.

RECENT PATENTS.

No. XIV—WOODBURY'S METHOD OF PHOTOGRAPHING FROM A CAPTIVE BALLOON, AND HIS PORTABLE CAMERA.

At the last photographic exhibition held in London there was exhibited a camera which, as respects compactness and portability, possessed certain features of novelty, the leading one being found in the fact that the packing-case—a neat mahogany box—forming part and parcel of the camera was used for the twofold purpose of forming a packing-box for the instrument when folded up as well as that of a base-board on which to erect the camera when expanded for use.

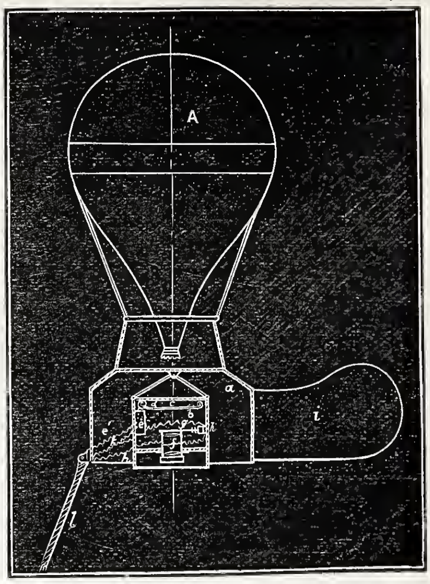
We are at length in a position to redeem the promise we made when, in alluding to it last year, we observed that as it had then just been patented we should embrace an opportunity of describing it in detail as soon as the specification of the patent had been published. This we do in the present article.

Conjoined with the portable camera, Mr. W. B. Woodbury, the patentee, has also secured in the same patent a second invention, which consists in the means of obtaining photographic views of *terra firma* from a balloon anchored, so to speak, at any desired height above the earth's surface. In what manner this is proposed to be effected will be discovered from the following detailed description. Following the order of the specification of the patentee, we deal first with the balloon and afterwards with the portable camera, between which instruments, we desire it to be observed, there is nothing in common farther than that, to save time and trouble, both inventions happen to be associated in the same patent:—

This invention relates, firstly, to improvements in apparatus for obtaining photographs from a sufficient height above the surface of the earth by means of a "captive" balloon (or balloon held down by a rope) carrying the necessary photographic apparatus, the necessary manipulations for the purpose of manipulating such apparatus and obtaining the photographs being effected by an operator on the earth by means of suitable electro-magnetic apparatus actuated as desired through insulated wires entwined with or supported by the rope which connects the balloon to the earth. In the place ordinarily occupied by the car of the balloon is attached a box of sufficient size and of suitable material, open below, and having attached to one side of it the rope by which the balloon is held. At the opposite side of the box is fixed a vertical plane of as light material as possible, serving as a sail or rudder, the action of the wind upon which prevents the balloon from turning round. In the inside of the box is suspended upon a pivot fixed in the top of the first box a second box or camera, which thus remains always horizontal. This second box or camera is provided with a suitable photographic lens, pointing downward, at the proper distance above which is arranged horizontally a dark slide provided with two rollers carrying a sheet or strip of flexible tissue made sensitive to the action of light in the way well understood and practised. One of the rollers is provided with clockwork, by the revolution of which the sheet of sensitive tissue is drawn forward from one roller to the other, as desired, and this clockwork is made to revolve for a sufficient time, when desired, by the action of electro-magnetic apparatus connected with it, and set in operation by completing or interrupting a current of electricity made to pass through insulated wires passing to the earth either with the rope which holds the balloon or suspended to such rope. The clockwork may be actuated by a spring retained by a detent, which can be released by the electro-magnet when required, or it may be actuated by a detent or driver operating upon a ratchet wheel, and set in motion by the electro-magnet. Another electro-magnet, actuated by separated insulated wires, actuates a shutter arranged in front of the lens, which latter can thus be instantaneously uncovered and reclosed when desired. The instantaneous shutter may be composed of a disc of metal, ebonite, or other suitable material, having an aperture near one of its sides, and made to revolve rapidly in front of the lens when required by means of an india-rubber or other spring when released by the catch or detent already described; or a shutter made to oscillate from side to side may be used. Three wires are extended between the balloon and the earth—one to operate the clockwork which actuates the sensitive tissue, one to operate the instantaneous shutter, and the third to make the return circuit to the earth.

In the accompanying diagram *fig.* 1 is an illustration of this part of the invention. A is the balloon; *a* is the box in place of a car; *b*, the camera; *c*, the sheet of sensitive tissue wound round two rollers, and actuated by the clockwork *d*, which is set in motion by electro-magnetic apparatus in the frame *e* by means of the wire e^1. The lens *f* is uncovered when required by the instantaneous shutter *g* set in motion by the electro-magnetic apparatus *h* by means of the wire h^1; the rudder or fan *i* is attached to the box *a* to keep the latter in one position. The wires e^1 and h^1, and the return wire k, are contained in the rope l, by which the balloon and apparatus described are held to the earth. When the balloon is elevated to its proper position, with the sensitive tissue in its place, and the lens focussed for the extreme distance, electric communication can be made with the shutter, thus giving an instantaneous exposure to the prepared surface. The electric communication being then transferred to the wire in connection with the clockwork will cause this to move for a sufficient distance, thus giving a fresh sensitive surface for the next exposure, and so on, thus enabling a series of photographs to be obtained while the apparatus is elevated at the same or different altitudes.

FIG. 1.



The special claim made by Mr. Woodbury in regard to this portion of his invention is the combination, with a captive balloon, of the photographic apparatus actuated by means of electricity, conveyed as required through wires supported by a rope which retains the balloon to the earth, substantially as described and shown. Also, the arrangement of a tail or rudder for the purpose of keeping in its proper position the captive balloon provided with the photographic apparatus, substantially as described and shown.

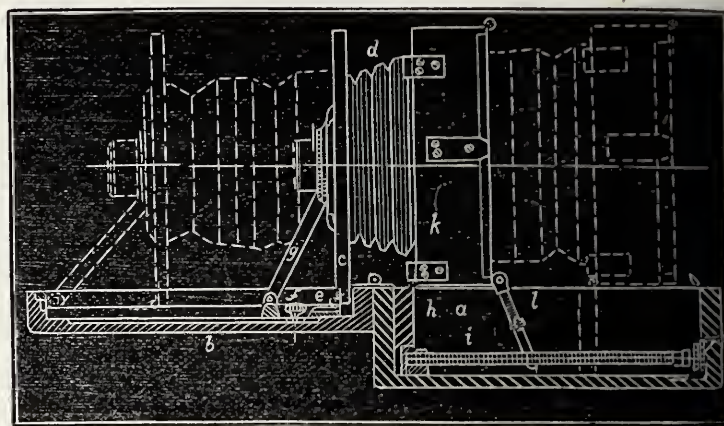
The second part of the invention consists of a novel form of photographic camera, so arranged as to be in the form of an ordinary box with a hinged lid, the body of the box containing the "bellows" or expanding part of the camera, and the shallower part or lid of the box containing the movable front of the camera carrying the lens. When opened the bottom of the box is supported upon any sufficiently rigid stand or frame, and the hinged lid being thrown back carries the front and lens, and gives sufficient firmness and length for long-focussed as well as for short-focussed lenses. To determine the position of the lens a marked scale is fitted into the lid, by which the point to which the front of the camera should be drawn out is very nearly found, final accurate adjustment being made by means of a screw working in a nut fixed to a slide moving horizontally in the body of the box and carrying the back part of the camera. When closed the apparatus resembles an ordinary writing case or despatch box. The back part of the camera is attached to the frame which slides in the box, as already described, by means of a hinged joint, and a screw of adjustable length is arranged between a joint at the bottom of the box and a joint at the bottom of the camera, so that the back of the latter may be thrown more or less out of a vertical plane if desired. The sliding frame which carries the front of the camera (in the lid of the box) is made capable of turning upon a vertical pin or screw, so that the front of the camera may be made more or less parallel with its back if desired.

The slide for holding dry plates is constructed as follows:—A thin wooden frame, joined at the corners, has at one end an opening, through which two dry plates, placed back to back, can be inserted, a piece of thin metal of a bent or waved form being placed between them to act as a spring and keep them in contact with the frame when inserted, a thin wood or metal shutter or cover closing the opening against light.

Instead of the ordinary wooden slide for uncovering or exposing the plates the inventor prefers to use a sheet of thin, flexible metal, which can be bent to one side during exposure, and again resumes its original shape when closed; or a stouter sheet of metal may be used, only the joint upon which it turns back being formed of a thin, flexible piece of metal.

In the accompanying drawing, *fig.* 2 illustrates this part of the invention, the box being shown open and the camera in its place:—a is the body of the box and b its hinged lid, both shown in section; c is the lens fixed to the front of the camera d, which is hinged to the frame e sliding in the lid b. The frame e has its ends rounded, so as to be capable of turning round the screw f, by which it is fixed when adjusted; g is an adjustable stay for holding the front c more rigidly; h is a frame which can be made to slide backward and forward in the box a by means of the screw i, and which has hinged to it the back of the camera k, the vertical plane of which can be adjusted by means of the variable-jointed screw l. The position of the lens and front of the camera are adjusted in the lid of the box, and the back of the camera in the body of the box, as shown in dotted lines.

FIG. 2.



The whole of the apparatus folds, when required, into the box, which can then be closed and locked.

The features claimed are the novel construction and arrangement of photographic camera, one part of which fits into, and is adjustable upon, the lid of a box, whilst its remaining part fits into, and is adjustable upon, the body of the same box, substantially as described and shown in the diagram. Also, the method of constructing the sliding shutter or its hinge of thin, flexible metal, substantially as described.

The camera here described, as we have stated, was shown at the last exhibition of the Photographic Society of Great Britain, where it proved an object of much interest.

According to present appearances the time is not far distant when an "instantaneous" shutter will form as necessary a part of the dry-plate photographer's equipment as are his lens and camera—if not for all his work, at least for a great part of it. The extraordinary degree of sensitiveness which is now attainable with dry films, combined with the assistance rendered in the same direction during the last few years by the opticians, is bringing into vogue an entirely new class of subjects—subjects which a short time ago it was impossible to attempt, scarcely even to dream of, unless wet plates of the very highest quality were employed. There can be little doubt that as we become more familiarised with the new power thus placed in our hands "instantaneous" photography will come more and more into favour, and the necessity will arise for an effective and, what is of equal importance, simple mechanical arrangement by which exposures measuring but a fractional part of a second may be given. The simplest plan by far which has yet been introduced is the so-called "drop shutter," which consists of a strip of metal or wood sliding vertically in a slotted framework, and in the centre of which is an aperture of adjustable dimensions. By suitably-adjusted springs this aperture is made to pass rapidly across the front of the lens, and the exposure thus given may be regulated within certain bounds by varying the width of the aperture in the sliding shutter. This simple arrangement is only surpassed by some of the more elaborate and, consequently, expensive instruments in one respect, namely, that some of the latter are, by ingeniously-contrived mechanism, made to give a longer exposure to the foreground than to the sky in order the better to secure natural clouds; for it is obvious that, however short the exposure may be, if it be sufficient for terrestrial objects the clouds will require less for their proper rendering. If the "traverse" of the "drop" shutter be changed from a vertical to a horizontal direction we can then utilise the principle (first adopted, we believe, by Mr. J. R. Johnson in his pantascopic camera) of a triangular or converging aperture through which to make the exposure. It is plain that if a converging slit, the narrowest part of which is uppermost, be made to pass horizontally in front of the lens, the lower part of the latter will be exposed for a proportionately longer time than the upper part, according to the degree of divergence given to the edges of the aperture, one of which may be fixed and the other adjustable at pleasure. We give this as a "wrinkle" (not new, perhaps) for the benefit of the mechanical portion of our readers.

BROMIDE OF ZINC.—CITRIC ACID IN EMULSIONS.

I have been trying the method of making zinc bromide described in a recent editorial article, and, as far as I can judge from so short an experience, it is likely to be a very great assistance to those who are so placed as to be unable to obtain the salt ready for use. I have made an alcoholic solution of the cadmium salt of known strength, and simply immersed in it a few clippings of common sheet zinc, which appears to be sufficiently pure for the purpose, and, I fancy, acts more quickly than when the metal is employed in the granular form.

It is advisable before immersing the zinc in the bromide solution to dip it for a few seconds into dilute sulphuric acid, and then to wash it well in clean water. This removes the thin film of oxide which invariably covers the surface, and causes the bromide of cadmium to attack it at once. If it be thrown into the bromide before this cleansing operation has been performed some time will elapse before the solution commences to act, and then the reduction of the cadmium proceeds very slowly. With granulated zinc the case is far worse.

If the double bromide of cadmium and ammonium be employed the reduction appears to take place more rapidly than with cadmium alone, and the result is, of course, a solution of double bromide of zinc and ammonium, which I prefer to zinc alone. With some descriptions of collodion the zinc salt alone seems to exercise too caustic an action, especially if the bromising has been done some time before sensitising; but with the addition of ammonium there is less "rotting" of the film, and at the same time the facilities for obtaining density are greater, while the well-known opacity of the film obtained with zinc is not lost. A further and by no means unimportant advantage is that the ammonium salt is something like one-third the price of cadmium.

Three separate quantities of the same collodion were bromised, respectively, with the double salt of cadmium and ammonium, with zinc alone, and with zinc and ammonium—the same relative quantities of bromine and of silver being employed in each case, and the same conditions, as far as possible, being observed throughout. The first gave a clear, transparent film, developed rapidly, but required some little pushing to get printing density; zinc alone intensified easily to any desired extent; while zinc and ammonium gave, if anything, rather too much density unless treated very "gingerly." The two last films were scarcely distinguishable as regards opacity, though they differed widely in appearance from the first mentioned.

Zinc bromide alone, with three grains of free silver and two drops of nitric acid to each ounce of emulsion, gave, twenty-four hours after sensitising, the most peculiar result I have ever attained in emulsion work. The emulsion itself, though very dense, was almost entirely devoid of even the orange tinge of colour—ruby it certainly did not show. A plate was coated and washed, when it presented a dense, smooth, yellowish-brown colour by transmitted light, and when dried a most strongly-marked steel blue—quite as dark, though not so brilliant, as the temper colour of watch springs. This seemed anything but promising; but upon moistening with alcohol after exposure the change was very remarkable, the colour being many shades warmer than before drying—in fact, a bright, though not deep, orange. I did not anticipate any very great result, and was therefore considerably astonished upon developing a picture which was in every way satisfactory, and with any amount of density—the first instance, in my experience at least, where the latter quality has been obtained with one of the blue or cold-toned emulsions. Can this be a peculiarity of the bromide formed in the manner described? I have used zinc frequently under almost identical conditions and never attained a like result.

I may further add that the emulsion was divided into two parts—one of which was "washed" and the other "precipitated." The resulting emulsions gave films of much the same character as before washing (though rather thinner), but were *entirely useless* photographically, not only refusing to give density, but showing scarcely any capability to form an image of any sort.

The method the Editors have described for the preparation of zinc bromide will prove a great boon to many emulsion workers, as it will enable them to prepare cheaply and in a convenient form a salt which is difficult to obtain in most localities, and, when obtained, is no less difficult to handle accurately; its preparation by the ordinary methods in an amateur's laboratory is little less than an impossibility. It is, no doubt, the most useful of all bromides for emulsion; but for washed or precipitated emulsions I have always experienced considerable difficulty in using it in connection with free silver. With a slight excess of bromide, or in an unwashed emulsion, it answers admirably.

While on the subject of free silver I may remark that one of the substances mentioned in your leading article, last week, on *A New Method of Correcting Emulsions* I have had in use since the beginning of the present year. I allude to citric acid, which I have used alone and in conjunction with nitric acid for some time. My experience of its properties is simply this—that never until I employed citric acid did I believe in the possibility of washing or precipitating an emulsion containing free silver so as to obtain an invariably successful result. Now I do; and, not only that, I find it possible to use a very large excess of silver, giving great sensitiveness and, at the same time, facilities for obtaining density equal to the old collodio-bromide process. I speak of excess of silver; but, according to the Editors' view, it is no longer excess (in the sense of soluble silver) if sufficient citric acid be used. At anyrate, it gives sensitiveness combined with density; but if you allow the emulsion to "ripen" too long *it ripens into a jelly*. This, however, need not occur if it be used in moderation and due care be taken in the sensitising. I mean to try some of the other "correctors" as soon as I have time.

W. B. Bolton.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

The great event of the past month is the discovery of the cause of the deterioration of certain carbon prints, which have not retained their whites in a manner so unspotted as to warrant us in affirming that they have kept the promises they were assumed to have made—by deputy. Well, seeing that it is now known that a few samples of white paper will acquire a yellowish tint when exposed to the light, let us be thankful for the knowledge, because, in a sense, the proverbial axiom "to be forewarned is to be forearmed" applies here. As it is a small matter, and one that can be easily remedied, I need say no more about it except this—that infinitely sooner would I accept the portrait of a dear friend or the photograph of a favourite landscape printed in the most objectionable carbon, and upon the most objectionable and yellow-stained transfer paper mount, than in the richest, most blooming, nay most *luscious*, silver printing. It was my good fortune to receive, about eight or nine years ago, a work on a certain photographic subject, and to which I have sometimes occasion to refer. This work contains, among other illustrations, a carbon print as a frontispiece and a silver print in the body of the book. At that time opinions were a little divided respecting the technical merits of the two prints. "Never no more" will there be any dubious comparison instituted between them! In the silver print the whole details of the face, the hands, and the feet (for the argentiferous photograph represented a bare-footed peasant girl) have departed, leaving in their place nothing but sickly yellow paper. The blacks, too, have become a dingy, faded brown. As for the carbon print, it appears by the force of contrast to be even more brilliant and beautiful than it was originally. After this, who will institute comparisons between the two methods?

I am about to offer to photographers a bit of good, practical, commonsense advice, based upon a bit of recent experience. The subject of my photographic effort on that occasion belonged to that useful quadrupedal family one of whose members has long been celebrated in runes, if not in rhymes, as having, by the application of its horn, "distort to realms ethereal" borne the braggart hound that worried, &c., &c. In short, my subject was a cow with a crumpled horn. The animal herself, including the head and the crumpled horn, I managed to pourtray with the greatest ease; but not so the tail of the patient bovine—*it* persisted in indulging in pendulum-like efforts to wage ineffectual war upon sundry flies. I gave it up as a bad job, and left the field with four negatives of "crummie" *minus* the tail. A thought occurred to me—the caudal appendage of one cow bears a marked resemblance to that of any other animal of the same family. The result of a friendly interview with a butcher was my eventually obtaining several negatives, of various dimensions, of bovine tails, which, like the cloud negatives of a landscape photographer, could be pressed into service when the original tail had been indulging in oscillatory movements during exposure. The idea is applicable to horses and other animals as well as to cows. The offending member in the original negative may either be "stopped out" and the other printed in by a subsequent operation or, better still, it may be removed entirely by means of a strong solution of iodine in cyanide of potassium, and the film containing the supplemental tail attached, by transparent cement, to the negative. It requires care, but it *can* be done, and that, too, most effectively.

The six lectures *On the Application of Photography to the Production of Printing Surfaces* delivered by Mr. Bolas a few months ago before the Society of Arts, and which have just been published, form an excellent epitome of the chief advances hitherto made in this direction. Those who were present at the delivery of these lectures assert that a more successful effort at illustrating the practical details of the various processes described has never been made—a statement which, from a partial knowledge of the lecturer, I am well prepared to accept. It would prove of incalculable benefit to photographers if such a course of practically-illustrated lectures were given under the auspices of the Photographic Society of Great Britain during the ensuing winter. It is valuable to *read* such lectures after they have been delivered; but how much better is it to *hear* them, and witness the various experiments conducted in a skilful manner!

(To be continued.)

ON INCREASING THE SENSITIVENESS OF AN ORDINARY EMULSION.

Although I have always held, and still hold, that for ordinary landscape work a slow-acting plate—that is, a plate prepared with an emulsion containing a trace of free bromide, and requiring an exposure of from five to ten minutes—is more certain in its action and less troublesome in its manipulation than in cases where anything like the rapidity of wet collodion has been sought for, there are times and circumstances when a considerable increase of sensitiveness is desirable. That a rapidity far in excess of ordinary wet collodion may readily be obtained with gelatine emulsions, and that at considerably less cost than with collodion, has been abundantly proved during the past six months; but gelatine, in the hands of probably a majority of those who have tried it, is still a kittle substance. While the successful few are fighting its way to popularity it may not be altogether labour in vain to point to a way whereby the sensitiveness of an ordinary collodion emulsion may be vastly increased.

The fogging propensities of alkaline or neutral solutions, which so troubled operators in the early days of photography, laid the foundation of a belief in the necessity for free acid almost everywhere—a belief which is even now difficult to eradicate, and which caused the alkaline method, when first suggested by the late Mr. T. Sutton, to be received with much distrust and no little opposition. Like many of the suggestions, however, of that close experimentalist it deserved more attention than it received at the time, and the seed then sown is likely now to bear fruit.

Readers of The British Journal of Photography cannot fail to have noticed the persistency with which Mr. H. J. Newton, of New York, has laboured at emulsions; and, although from the not infrequent high-flown style of American photographic literature his experiments and the results deduced therefrom may not have met with so much attention as they deserve, there can be no doubt that his proposal to render a plate thoroughly alkaline before exposure enables it to receive a developable image in a fraction of the time required without such preparation. In a former note on this subject I stated that I had in my possession several portraits by Mr. Newton, including one of himself, taken in an ordinary studio with an exposure of only three seconds, under circumstances which required at least three times as long with wet collodion; but in those cases the alkaline accelerator was applied to the moist emulsion, and the exposure made while in that state.

From a number of experiments made during the past fortnight, as well as from information gathered from other workers, I have reason to believe that the accelerator is equally applicable to plates that are to be dried, although the amount of acceleration does not appear to be quite so great.

The first experiments were made with a commercial washed emulsion that had been in my possession since May, 1877, and which gave a rich, creamy film that transmitted the ruby tint indicative of an emulsion in good working order. Plates simply coated with this and dried were found to require an exposure of from five to seven minutes, and were easily developed to fulness of detail; but they obstinately refused to acquire anything like sufficient density, and in spite of much painstaking care were covered with apparent dust marks.

A subsequent batch was washed till greasiness disappeared, and flooded—some with Newton's solution of tea, some with a ten-grain solution of tannin, and some with ordinary bitter beer; and they all, without exception, were easily developed to printing density. But for the best results an exposure of nearly half as long again was required in the case of the beer, and at least a third with the tea and tannin, while the dust markings had disappeared.

A third batch of plates were then prepared, with the same organifiers or preservatives, but after washing one half of each was immersed for half-a-minute in the accelerator and again washed before the organifier was applied. The effect of this treatment was very marked. Although the first few plates received only about half the exposure given to the previous lots, the images on the halves that had been rendered alkaline were fully visible before the application of the developing solution. In spite of a much larger supply of bromide they showed a slight tendency to fog, and that long before a trace of an image had appeared on the other halves. With a view to make quite certain that the "accelerator" really acted as such, and not merely as an aid to the developer, a number of the plates were exposed for various lengths of time and then cut in two, and the halves developed separately, the result being that, while the alkaline halves yielded good negatives, no amount of pushing would give more than skies and higher lights on the others.

Similar experiments were made with a variety of emulsions, including that made by Mr. Newton, which, I understand, originally contained an excess of silver that was subsequently decomposed by a chloride, and also that used by most of the Edinburgh workers, in which the salts are used in as nearly as possible their combining proportions and afterwards adjusted so as to contain the merest trace of free bromide. In all cases the result was the same—a large increase of sensitiveness whenever the accelerator was employed, and that without any corresponding disadvantage except the additional trouble, but that may be reduced to a minimum by having the solution, which will keep indefinitely, in a dipping bath.

Regarding the relative merits of the three organifiers employed in the foregoing experiments, the superiority lies undoubtedly with the tea. Beer is considerably slower than either of the others, but works clean; and unless the exposure has been excessive it requires no bromide or other restrainer in the developer. With tannin the image is inclined to hardness, and the deposit is generally of a bluish-purple colour that is objectionable from a printer's point of view. Tea seems to have the good qualities of both without the faults of either; and, as the alcoholic solution will keep indefinitely, it simply requires dilution to be ready for use. The solution used, being a slight modification of that employed by Mr. Newton, is as follows:—

Assam tea	1 ounce.
Alcohol	4 ounces.
Water	4 „

Boil gently for one minute, let stand till cold, and filter. The organifier is made by adding an ounce of this to a pint of water. The accelerator was Mr. Newton's, and consists of—

Carbonate of soda	180 grains,
Bromide of ammonium	2 „

dissolved in twelve ounces of water.

My notions as to the theory of the action of the accelerator I must reserve for a future article, as I shall conclude this by saying, on the evidence of the negatives now lying before me, that by its aid, especially in conjunction with the tea preservative, I can get as good a negative—and by that I mean as fully-exposed a negative—in one minute as without it I formerly got in ten. John Nicol, Ph.D.

RECENT PHOTOGRAPHS OF THE EARL OF BEACONSFIELD.

Being aware that of late years Lord Beaconsfield has expressed a very decided reluctance to have his photograph taken, we cannot avoid suspecting that Mr. Jabez Hughes will be an object of envy to many of the fraternity who have tried, but tried in vain, to bring influence to bear upon the Premier to submit himself to the magic gaze of the photographer's lens. The following clever article on this subject appeared in the *Isle of Wight Times* of the 29th ult.:—

That we cannot fully support the policy of the Premier our readers are well aware. Our remarks, therefore, will not bear the interpretation that we have yielded to the fascination of this too popular statesman. They are grounded on reflections suggested by a calm examination of a remarkable series of his portraits recently produced by our well-known townsman, Mr. Jabez Hughes.

It has been remarked by a witty writer that photography has added another "penalty of greatness;" no sooner does a man achieve fame than a craving arises to possess his photograph, and, as no one is able to resist the demand, the photographer—more merciful than the headsman of old—proceeds to take off his head. The simile may be extended, for by the old way the man's career was cut short, but by the modern one his influence only increases. Some of our great men seem to submit more readily than others to this modern penalty. Of this our present and past premiers are marked examples. Mr. Gladstone has taken kindly to the modern custom, and from early manhood to his present ripening age photography has made us familiar with the changes time has made on his expressive face. His last portrait is curiously symbolical of his career; for, having surrendered the destruction of ancient abuses, he is now represented in his shirt sleeves hewing down old trees. On the other hand the Premier seems, for a reason we cannot understand, to have been chary of supplying food for the camera. He has been coy, and his visits to the glass-room have been few and far between. When the future historian, in descending to details, contrasts these two remarkable men we hope this curious fact may not escape attention.

That photographs are abundant of his lordship we are aware, but they are not recent ones; for we have been informed that an interval of more than ten years occurs between the taking of his previous and these last ones. Can the same be said of any other popular man? And what a change has occurred in this decade! *Then* he and his party were struggling, metaphorically speaking, to sow the mustard seed of the conservative tree, and *now* its branches, unfortunately, spread all over the land. If the reputation of Gladstone be as a fixed star, and that of Beaconsfield but as a meteor, we cannot deny that it is a brilliant one, for, like him or not, he is one of the most remarkable men of our time. When he took the daring step of going to Berlin to measure swords with the Bismarcks, Andrassys, and Gortschakoffs, many of us who did not believe in him dreaded the result; but whether for good or ill he undoubtedly made his influence felt, and he left the congress a greater man than he entered. Differing as we do, we cannot help feeling a secret gratification that when among the wily diplomats the representative of Old England was a match for them all.

With these feelings we study with increased interest this interesting series of portraits. The artist, Mr. Hughes, seems to have been impressed with the exceptional honour of taking the portraits, and has made the most of the occasion. There are profile views of either side of the face, full face, three-quarter face; with the hat on, and without; looking you straight in the eyes as if demanding what you thought of him and his policy, and looking away into the far-distance as though speculating whether his work will end in huge failure, as we fear; or, anticipating the brilliant success that possibly he may believe in. But the one we are most inclined to is where he is reading a newspaper. This may arise from a professional bias. There is no mistaking that he is studying the article; it is probably some deservedly caustic critique on his foreign policy, for the earnestness of the expression shows that he is deeply interested. Altogether the series are very interesting, and are as excellent as photographs as they are artistic as portraits.

THE REACTIONS OF CHROMIC ACID AND CHROMATES UPON SUBSTANCES OF ORGANIC ORIGIN, CONSIDERED WITH REFERENCE TO THEIR USES IN PHOTOGRAPHY.*

Behaviour of Chromated Gelatine with Heat and Moisture.

The behaviour of a mixture of potassic bichromate and gelatine with heat and moisture in the absence of light varies very greatly, owing to apparently trifling changes in the proportions of the reacting agents. All the operations mentioned in this section were, when the contrary is not expressly mentioned, conducted in the dark. Potassic bichromate does not change a gelatine solution when boiled five to ten minutes on the water bath; also, the mixture, when afterwards dried, still retains all the properties of the original gelatine. But if the heating at 100° C. lasts one or more hours, more water being added to make up for that lost by evaporation, the fluid becomes thick and stiffens at a comparatively high temperature. If the bichromated gelatine thus boiled be dried and then treated with cold water it swells up well, though not so readily as formerly, but will have for the most part lost its solubility in hot water. Indeed, fifteen minutes' boiling is often sufficient to deprive gelatine, after drying, of its solubility in hot water. Many photographers have also observed that even when bichromated gelatine has been heated for a short time at 60° or 80° C. an insolubility of film is afterwards experienced; but I cannot substantiate this observation.

It is, however, advisable in all cases not to heat the mixture of gelatine and bichromate more or longer than is necessary for the solution of the glue; and if the gelatine be previously swollen in cold water a temperature of from 40° to 50° C. should be sufficient. The idea that too much bichromate of potassium can of itself produce insolubility I believe I must correct so far as to say that the effect of a high temperature, as above mentioned, is produced more quickly when the bichromate solution is concentrated. The greater the bichromate contents the more difficult of solution is the gelatine after drying, especially if the films are dried slowly. Sensitised carbon tissues require, twenty-four hours after drying, a somewhat warmer (about 2° to 5° C.) water to dissolve them than before being bichromated. Batho[1], who has experimented in this direction with different sorts of tissue, has arranged a table showing the degrees. According to it unsensitised carbon tissue, which dissolves at 28° to 32° C., would, other influences (such as light or reducing agents) apart, when sensitised be soluble at 33° to 35° C. As to the effects of various degrees of concentration of potassium bichromate on the hardness, brilliancy, &c., of the carbon picture and upon their influence in the development of granularity in lichtdruck plates[2] one can only take up these points in detail in a practical work specially devoted to the subject.

Generally speaking, however, one may assume that the higher the percentage of the bichromate contents the more granular the film will be, and the poorer the bichromate contents the smoother the film. But the drying temperature has also a great influence on the formation of the texture, as a very low temperature as well as too[3] high a one makes a film free from granularity. Certain additions which keep the glue fluid, such as acetic acid and calcic chloride, favour the formation of granulation even when the films are dried at a low temperature. Acetic acid produces a very fine granulation. Thick films produce a coarse grain. Very concentrated gelatine solutions furnish a very rough printing grain (lichtdruck). One requires to use, according to the quality of the gelatine, from eight to sixteen times its weight of water[4]. Old plates give a finer grain than fresh ones. If two plates be dried at the same temperature, but one in a greater current of air than the other, the grain will be coarsest on the former. In exposing, sunlight gives a finer grain than diffused light.

So far as carbon tissue is concerned, however, we can only say that, generally speaking, dilute bichromate baths give more brilliant prints than concentrated ones; that, generally, tissue sensitised upon weak chromate baths give harder prints than those prepared upon concentrated baths. This general rule presents the advantage of allowing a thin or flat negative to be printed on tissue sensitised on a weak (say one to two per cent.) bichromate solution, and a dense negative on tissue prepared in a stronger (say five to six per cent.) solution. Too weak a bath gives no half-tones; too strong a bath produces reticulation[5]. Compare the foregoing remarks with those which will follow on the various concentrations of the bichromate bath in summer and winter.

When carbon photography was first introduced it was supposed by Rousseau and Masson[6] that the mixture of bichromate of potassium and gelatine, when stored in the dark and at an ordinary temperature, would keep for a very long time. This is, unfortunately, not the case. It is not at all necessary to heat the bichromated gelatine in order to render it insoluble. It is sufficient to let the bichromated gelatine stand a few days at an ordinary temperature in a damp, gelatinous condition in order to deprive it of its solubility in warm water. Even when standing for only twelve hours in the damp condition the decomposition is remarkable. Sensitised tissue which has stood so long damp gives bad prints. In the case of lichtdruck plates the insolubility is much later in appearing, because the films do not lose their capacity for swelling up in the same degree as their solubility in hot water. In photogalvanography and all those photographic processes in which the complete solution of all the unlighted gelatine parts takes place, the setting-in of insolubility is much more injurious than in lichtdruck, where the power of swelling up only requires to be preserved. A photogalvanographic plate should not remain damp more than twenty-four hours[7]. Bichromated tissue which has required a long time (in damp weather) to dry developes with difficulty, and the result is not so clear and brilliant as if the tissue had been quickly dried. Tissue should not take more than six to eight hours to dry[8]. This is a warning to photographers to dry their bichromated gelatine quickly, but, on the other hand, not at too high a temperature, as the long heating of gelatine that has been dissolved in water also produces insolubility.

Bichromated gelatine dried in air is much less liable to become insoluble through lying in the dark at an ordinary temperature than when in the gelatinous form; still, it does usually become insoluble in about eight days—often on the second, third, or fourth day, but sometimes, again, not for several weeks, and even under favourable circumstances sensitised tissue has been *usable* after being kept for months,[9] though not without deterioration in quality. Generally it is best to use sensitised paper one to three days after preparation, as one can then assume with greater certainty that it has not yet undergone any change. In cool weather sensitised tissue keeps about twice as long as in warm

* Continued from our issue of April 26th, page 198. The reason for the long delay in publishing the continuation of this prize article by Dr. Eder is that the publication of the *Photographisches Correspondenz*, to which we are indebted for the article, has been suspended for six months.

[1] Batho. *Photo. News*, 1877, p. 9.
[2] See Martin. *Email Photographie*, 1872, p. 318.
[3] Husnik. *Ges-ammt-gebiet dus Lichtdrucks*, 1877, p. 55.
[4] Lemling. *Photo. Correspondenz*, vol. xiv, p. 185.
[5] Lambert. *Photo. News*, 1877, p. 86.
[6] Dingler's *Polyt. Journ.*, vol. clx., p. 50. Martin, *Email Photographie*, 1872, p. 137.
[7] Woodbury. *Photo. Correspondenz*, vol. vii., p. 212.
[8] Braun. *Photo. News*, 1877, p. 127. (At about 10° to 20° C).
[9] Kruger. *Photo. Mittheilungen*, vol. xiii., p. 206. Despaquis. *Photo. Archiv*, vol. x., p. 37. *Ibid*, vol. ix., p. 110.

weather; also, that sensitised on a weak bath keeps longer than that sensitised on a strong bath. Audra's observation[1] is interesting. It is that bichromated gelatine films (carbon tissue) when stored for two years in the dark room became so perfectly insoluble that even boiling water had no longer the power of dissolving it.

I have closely studied the effect of atmospheric moisture upon the keeping qualities of bichromated gelatine. Paper coated with bichromated gelatine (carbon tissue) keeps longer unchanged when kept in the dark in a drying box containing calcium chloride than in the ordinary atmosphere of a room. After eight days in printing a picture upon such tissue there is scarcely any observable change. Paper kept in this way is also much more soluble in hot water than that kept in ordinary air; the latter is also more inclined to fog. But if bichromated gelatine paper be kept in such a chamber, the bottom of which is covered with water, and in which, consequently, the air is saturated with water vapour, it will become insoluble twice as fast as tissue kept in air; often in a week such tissue would be almost perfectly insoluble in water. The bichromated gelatine films should, therefore, be stored in as dry a place as possible if it be desired to make them keep for any length of time in a usable condition. Besides, bichromated tissue which has been dried in dry air gives clearer and purer prints than that dried in damper air. This observation, which was made by Liesegang,[2] is perfectly correct. In America, according to Vogel,[3] the damp air from the lakes and rivers is the cause of great difficulties in the carbon process, causing the tissue to become insoluble very readily. According to a private communication from Leipold the same thing takes place in England and Portugal.

Gelatine containing only a small proportion of bichromate keeps best. With the increase of the bichromate the liability to become insoluble in the dark increases; that, at a high temperature, insolubility occurs spontaneously in damp bichromated gelatine more rapidly than at a low temperature, has already been mentioned.

An air-dried mixture of gelatine and bichromate of potassium becomes insoluble in hot water after being long heated to 100° C. This appearance only becomes distinctly evident after several hours' heating at that point; but long before that point is reached, and, in fact, in a very short time, the decomposition will have proceeded far enough to disturb the regular course of the photographic bichromate process. After heating for a few minutes to 150° C. bichromated gelatine becomes insoluble.

These conclusions apply both to chondrinous and glutinous gelatines. Gelatines rich in chondrine, however, are more likely than the other sort to be liable to insolubility, both when heated and when left standing long at an ordinary temperature.

The conclusions of the practical photographer are to the same effect; and he does not, on account of the facts just mentioned, cease his endeavours to dry the sensitive bichromated gelatine films so as to retain their original solubility—as is especially necessary in photogalvanography and carbon printing. Swan,[4] Liesegang,[5] Vogel,[6] Monckhoven,[7] Woodbury,[8] Boivin,[9] Liebert,[10] and Vidal,[11] all warn us against the slow drying of sensitive tissue, on account of its inducing insolubility. Other authors[12] also recommend us to dry rapidly, so that the gelatine should not remain long in a moist condition. It is also necessary to dry the film rapidly when it is requisite that the property of solubility in hot water be preserved. J. M. Eder, M.D.

(To be continued.)

ROYAL CORNWALL POLYTECHNIC SOCIETY.

Photographic Department.—Judges' Report. By Thos. Hart.

The Judges have much pleasure in bearing testimony to the great advance made in their department during the past twelve months, and to the exceedingly high character of the exhibits. The rules of art, in form, composition, light and shade, &c., seem to have been studied to good purpose by some of the photographers, and the consequence is that in many of their works there is a marvellous perfection that ministers to our noblest gratification; and the Judges hail with pleasure all those who are trying to lift photography out of the mechanical abyss, where it has too long remained, into a higher and purer sphere, and feel that they recognise, with their brothers of the brush, that the essence of art is spiritual.

Professional Photographers.

1. For the best landscape, size not less than 14 × 11 inches. First silver medal has been awarded to E. Forhead, Ventnor, for his fine view of *Old Church, Bonchurch*, No. 604.

2. For the best landscape, size not less than 11 × 9 inches. First bronze medal to Marsh Brothers, Henley-on-Thames, for their view in *Quarry Wood*, near Great Marlow, No. 619.

3. For the best landscape by the collodion emulsion process, size not less than 9 × 7 inches. First silver medal to W. England, for his splendid Swiss view, No. 666. Mr. England exhibits fifteen gems—views in Switzerland—all in his well-known style, possessing the highest artistic excellence. They are full of atmosphere—broad, yet exquisite in detail.

4. For the best interior, by any process, size not less than 11 × 9 inches. First silver medal to A. J. W. Penn, India, for his fine Indian interior, No. 684.

5. For the best portrait taken direct, size not less than 14 × 11 inches. First silver medal to W. M. Harrison, Falmouth, for his fine study, *Portrait of a Boy* (untouched), No. 639. This is more like a photograph from an "old master" than a study from life. It is full of artistic feeling; soft in outline, where it ought to be; the lines just strong enough where required, and all subservient to the face. It is a photographic triumph, reminding one of the "studies" seen in Rome and Florence.

6. For the best portrait, size not less than 10 × 8 inches. First bronze medal to Robert Slingsby, for his *Portrait of a Lady*, No. 650. This is a very fine study, beautifully modelled, well lighted, and very soft—one of the finest portraits in the collection, from an artistic point of view.

7. For the best group, composition or otherwise, size not less than 14 × 11 inches. First silver medal to Chaffin and Sons, for their group, *Checkmated*, No. 614. This is a very fine composition, though the high lights in the faces are rather too strong. This remark applies particularly to No. 611, *The Musicians*, which seems underexposed, and to No. 612, *Popping the Question*, in which the heads are out of focus. But the Messrs. Chaffin are working and striving in the right direction, and, with a little more well-directed perseverance, we believe they will attain to the highest excellence. We hope to see their works again next year.

8. For the best enlargement, landscape (in carbon), size not less than 20 × 16 inches. First silver medal to W. M. Harrison, for his enlargement (untouched), No. 637. This is a view at Seaton, Devon, and is very fine in detail.

9. A first silver medal (special) is awarded to W. Brooks, Reigate, for his truly wonderful photographs of caves, &c., taken sixty feet under ground. The difficulties in a case of this kind must be immense, as they are taken by artificial light. Mr. Brooks had to deal with yellow rays as well as with the darkness of the caves. By whatever process he did them we consider the specimens sent triumphs of photographic art. They have all the characteristics of photographs taken in open daylight, being beautiful in detail, &c. The discovery is capable of being applied in various ways; and in a mining country, like Cornwall, it may be invaluable, as it shows that our deepest mines can now be photographed successfully. What next?

10. A special first bronze medal is awarded to Robert Faulkner and Co. for their powder enlargement, *Dorothy Morrison*, No. 585. This work is wonderfully delicate in detail, fine in colour, and is altogether a very artistic production. Messrs. Faulkner and Co. exhibit several others equally good.

11. A first silver medal is awarded to David Hedges for his *Studies of Animals from Life*, No. 596. These pictures are in the artist's best style, and unapproached.

Reuben Mitchell, of Bolton, sends some fine examples of dry-plate work, No. 582 being especially good.

Adam Diston's carbon enlargement, *The Broken Toe*, is a well-composed interior. The picture No. 609, *Henry Kirke White in his Study*, lacks focus, and the objects behind are too sharp; but Mr. Diston is working in the right direction, and we expect some fine specimens of photography from him. We hope to see his work here again.

Felix Bonfils sends several fine photographs from Egypt, &c., No. 634 being extremely good.

H. Garrett Cocking sends several splendid studies in his well-known style, No. 657, *Gitana*, being remarkably good.

Messrs. Geo. F. Dew, J. Milman Brown, T. Nesbitt, and the Cleveland Photographic Company send specimens of good and earnest work.

Messrs. W. H. Oakley and Co. send photographic appliances, with many improvements, in apparatus, &c.

Amateurs.

The amateur department is also very well represented, and has several workers "running hard" many professional photographers. Mr. Chas. A. Ferneley, for instance, exhibits six *Sketches near Reigate*, which are photographic gems; but we cannot understand how Mr. Ferneley, with his artistic feeling, could leave his skies so white; a little cloud here and there would make them perfect. The first bronze medal is awarded to his picture, No. 707.

T. M. Brownrigg has the first bronze medal for his *On the Blackwater*, No. 703.

Harry A. H. Daniel is awarded the first bronze medal for his *Cottage, Lynmouth*, No. 717. He exhibits a good collection of photographs by the wet collodion process, some of which are exquisite in detail.

[1] *Bull. Soc. Franc. Phot.*, 1872, p. 71.
[2] *Photo. Archiv*, vol. xv., p. 146.
[3] *Photo. Correspondenz*, vol. xiii., p. 239.
[4] ,, ,, vol. ix, p. 28.
[5] ,, ,, vol. v, p. 89. *Archiv*, vol. xvii, p. 8.
[6] *Pigmentverfahren*, 2nd ed.
[7] *Kohle Photographie*, 1876, p. 29.
[8] *Photo. Correspondenz*, vol. vii, p. 212.
[9] ,, ,, vol. xii, p. 49.
[10] *Photographic au Charbon*, 1877, p. 23.
[11] ,, ,, ,, Vidal. 1877, p. 5.
[12] *Photo. Archiv*, vol. ix, p. 28.

Other exhibitors sending good works are Mr. Louis W. England, Mr. Henry N. White, Mr. Edward Brightman, and Mr. J. Dudley Radcliffe.

A first silver medal is awarded to H. N. White, Isle of Wight, for his splendid series of photographic ceramics. These would do credit to any professional photographer. Mr. White must have an intense love for the art or he could not produce such work.

ON PROCESSES OF MAP PRODUCTION BY PHOTOGRAPHY.*

Photolithography and Photozincography.

In all the processes noticed in the last section it is necessary to repeat the printing operation by exposure to light for every print produced. The rate of printing will consequently be more or less dependent on the sensitiveness of the paper, the strength of the light at the time of exposure, and the state of the weather; the printing operations can, moreover, only be carried on during the few hours of daylight. In the photo-mechanical processes now about to be described these grave disadvantages are obviated, and, once the photographic image has been produced upon the printing surface, prints may be made in any numbers, quite independently of light or weather.

The simplest and most generally useful of these mechanical processes is photolithography, or the analogous photozincography, the principal difference between the latter and the former being merely the substitution of a thin, smooth plate of grained zinc for the thick, heavy lithographic stone. For maps of large size zinc is certainly the most suitable, and offers in other respects all the advantages of stone; but the latter being better known is generally preferred for ordinary work of moderate size.

In ordinary lithography the image may be produced on the stone or zinc either by *transfer* from a drawing on paper with the solution of resinous soap known as "autographic ink," or by *drawing direct* on the stone with a similar ink or crayon. So in photolithography there are two similar methods of obtaining the photographic image—either by transfer from a photographic print in fatty ink; or by impressing the image direct on the stone by applying a photographic negative on a suitable coating sensitive to light, and removing by means of a solvent the parts unaltered by light. The transfer method, being the most convenient, is the one in general use.

The first photolithographic process on record is that proposed by Jobard, of Brussels, who, in 1839, obtained lithographic proofs from stone or zinc plates that had been treated with iodine or bromine. This process never came into practical use, and has been quite superseded by two distinct methods—one dependent on the alterability of asphaltum under the influence of light; the other on the reactions of the alkaline bichromates upon gelatine and other colloid substances.

Asphaltum Methods.—In 1852 MM. Lemercier, Lerebours, Barreswil, and Davanne proposed a method of lithophotography in which a stone was coated with a solution of bitumen in ether, exposed to light under a reversed negative, and developed with ether, which dissolves the parts not affected by the light, while the exposed parts, being insoluble, remain and form the image. (Benzole, chloroform, or turpentine may also be used instead of ether.) After development the stone was prepared with acid and gum, and inked in the same way as an ordinary lithographic drawing.†

Since then many other similar asphaltum processes have been proposed and have been worked with great success, both for subjects in line and half-tone; but, owing to the length of exposure required and the uncertainty of the results, this process is not well adapted for general use, and has, I believe, been almost abandoned in favour of the collochromate methods.

Collochromate Processes.—Paul Pretsch, whilst working out his photogalvanographic process, hereafter to be described, discovered that if a mixture of gelatine and bichromate of potash be spread upon a suitable support, and, when dry, exposed to light, then again moistened and inked in with a roller charged with printing ink, the ink would only take upon the parts altered by the light, and thus impressions could be obtained by transferring the design to zinc or stone.

Pretsch does not seem to have made any practical use of this discovery, but shortly afterwards, in 1855, Poitevin independently worked out a photolithographic process on the same principle, which has been the foundation of all the present processes of photolithography and photocollotype, and is worked to the present day for the reproduction of the Belgian topographical maps. Poitevin impressed his photographic image direct upon the stone and not by transfer.

The first practical *transfer* process of photolithography seems to have been suggested by Asser, of Amsterdam, early in 1859. He coated unsized paper with starch, and then floated it on a strong solution of bichromate of potash. When dry it was exposed to light under a well-intensified negative. The print was next heated with a flat iron, then moistened and inked in with transfer ink by means of a roller, and thus an impression was obtained which could be transferred to stone or zinc.‡

* Continued from page 417.

† See Davanne, *Chimie Photographique*, p. 456.

‡ *Photo. News*, vol. iii., p. 146.

The next transfer processes were the Southampton process of photozincography, which was founded on Asser's, and Mr. Osborne's process of photolithography. These two processes, though quite independent one of the other, were identical in principle and almost so in details, the only difference being that Mr. Osborne added a certain proportion of albumen to the mixture of gelatine and bichromate, and then treated his prints with boiling water in order to coagulate the albumen and leave a slight coating of it on the paper, so as to obtain a "grip" on the stone during the process of transfer.*

These processes have occasionally been used with fair success for the reproduction of shaded maps, architectural views, and other subjects in half-tones; but they are not by any means suitable for such subjects, and are best adapted for the reproduction of maps and drawings boldly executed in dot or line alone.

They may also be used for copying prints or engravings of all kinds on the same, larger, or smaller scales; but engravings, and even many lithographs, are generally more or less unsuitable for the purpose. The best results are obtained from original drawings specially prepared to suit the requirements of photographic reproduction, in strict accordance with the rules already given.

The following outline of the Southampton method will give an idea of the operations. Like the pigment-printing process already described it depends upon the property possessed by a dried layer of gelatine and other colloids, when mixed with an alkaline bichromate, of becoming insoluble and repellent of water under the influence of light. The procedure, too, is much the same as in the simple pigment-printing process, except that, instead of the fatty ink which forms the image on the photo-transfer print being mixed with the gelatine, it is applied to the surface of the print after exposure to light. The inked print is then washed in hot water, by which the colloid coating in the unexposed parts is dissolved and carries away with it the superfluous ink not retained by the lines forming the image. The negatives are obtained by the methods already described applicable to the reproduction of subjects in line.

Having obtained a suitable negative, the next operation is to produce from it a photograph in greasy ink which may be transferred to zinc or stone. To prepare the sensitive paper, a sheet of bank-post paper is coated twice with a mixture of six parts of gelatine and four parts of bichromate of potash dissolved in one hundred parts of water, dried in the dark, and glazed to give it a smooth surface. It is then exposed to the light under a negative for one or two minutes to the sun, or until the finest lines are distinctly visible. When sufficiently exposed, which may be ascertained by the whole of the detail appearing in brown upon a bright yellow ground, the print is taken out of the printing-frame and passed through a lithographic press in contact with a polished stone or zinc plate which has been coated with a lithographic transfer ink, and thus receives an even coating of the greasy ink. The inked print is immersed for a few minutes in tepid water to soften the gelatine still remaining soluble in the parts not acted on by light, and then laid on a sloping glass or metal plate and gently washed with a sponge and warm water till all the unaltered gelatine is removed, carrying the superfluous ink with it. The lines, on which the light has acted, remain insoluble and retain the ink, forming a clear image of the subject in a greasy transfer ink, precisely similar to the ordinary lithographic transfer drawing. When all the details are clearly and sharply defined, and the ground is quite free from ink, the print is rinsed in clean water and dried. It is then ready for transfer to stone or zinc. J. Waterhouse, *Capt.*

(To be continued.)

* *Photo. News*, vol. iv., p. 374.

FOREIGN NOTES AND NEWS.

Dr. Eder's Request for Assistance.—A Direct Positive Process.

Owing to the absence of Dr. Hornig in Paris the publication of the *Photographische Correspondenz*, of which he is the editor, has been suspended for nearly six months, but has now been resumed. In the current number, which has just come to hand, Dr. Eder intimates that he is at present collecting materials for an exhaustive paper on collodion and pyroxyline, but that he finds considerable difficulty in arriving at the facts as observed by other experts on the following points:—The behaviour of collodion during its spontaneous decomposition; the age at which it sets in; and the circumstances most likely to induce it. He, therefore, begs any chemist or photographer who may be willing to give him the benefit of his experience to address his remarks to the care of the editor of the *Photographische Correspondenz*, who will forward them to Dr. Eder, by whom they will be thankfully received.

1. He wishes trustworthy information as to the properties of collodion cotton which has been kept for *years*, also as to the circumstances under which it was kept, and, when possible, as to its preparation as well as the eventual results of the reaction of the cotton.

2. He would be exceedingly grateful to anyone who would send him a sample of spontaneously-decomposed collodion cotton.

3. He would like to receive communications respecting the usefulness or uselessness of long-threaded, tough, collodion cotton for the ordinary wet silver process (for example, whether it induces rents when intensified), as well as the worthlessness of many short-threaded, friable cottons for the dry process.

The *Wochenblatt* gives the following method, by Herr Pellett, of producing drawings upon a white ground intended to be either strengthened or coloured by hand. The process is based upon the reduction by light of ferric chloride to ferrous chloride. The latter salt is not affected by a solution of ferrocyanide of potassium, while the former is immediately turned blue.

The paper upon which the print is to be made is sensitised by being dipped into a solution of—

Water	30 grammes.
Ferric chloride	3 ,,
Oxalic acid	1·5 gramme.

The oxalic acid may be replaced by an equivalent quantity of any other organic (especially vegetable) acid. If the paper do not contain sufficient size a little dextrine, isinglass, or some similar material may be added to the bath. The paper is then dried in the dark and may be kept, without losing its sensitiveness, for an indefinite period.

In order to reproduce a drawing place it upon a piece of dry sensitised paper, and place a sheet of glass above that again. In summer an exposure of about thirty, and in winter of from forty to seventy, seconds in the sun will be sufficient. In the shade from four to six minutes, and, when the sky is dark and overcast, from a quarter of an hour to forty minutes, will be required. Electric light acts very powerfully, the exposure varying according to distance and the density.

After the exposure dip the paper into a solution of eighty grammes of ferrocyanide of potassium in 500 grammes of water, which immediately turns all the unreduced parts of the ferric chloride blue. The picture should then be well washed and fixed in the following solution:—

Water	500 grammes.
Pure muriatic acid	50 ,,

Then well wash and dry.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Sept. 11	Glasgow	172, Buchanan-street.
,, 12	Manchester	Memorial Hall, Albert-square.

THE WEST RIDING OF YORKSHIRE AND SHEFFIELD PHOTOGRAPHIC SOCIETIES.

The first united meeting of these societies was held at Bolton Abbey on Wednesday, the 14th ult. Although the morning was exceedingly wet a good number had the courage to start from Sheffield; but by the time the two societies arrived at Ilkley, the place of meeting, the day gave promise to be fine, and immediately after they had secured their seats to start by conveyance to Bolton Abbey—a distance of about seven miles from Ilkley—the sun broke out and the drive was greatly enjoyed by all the party.

On arrival at the Abbey grounds there was an immediate display of cameras, ranging from 5 × 5 to 10 × 8. All used dry plates, for which there was plenty of scope. In less than half-an-hour the Abbey was surrounded, and the noble pile of ruins withstood the play of both large and small photographic ordnance. Some members who had no desire for photographing, and consequently had not taken cameras, assisted those who had, either in attempting to improve the view by their personal attractions or in selecting views.

At half-past four o'clock all were in the conveyances, which were supplemented by a private one that had shortly before joined them, from Mr. Sachs' establishment, Bradford. The order was given to start back to Ilkley, where a good knife-and-fork tea had been provided at the Rose and Crown, at which place the party arrived about six o'clock, having picked up on the way one more member of the West Riding of Yorkshire Society who had travelled all the way from Colne, in Lancashire, to join the meeting.

After doing justice to the "good things" provided by "mine host" a start was made to look round the picturesque visiting place, Ilkley, the party taking the direction of the high hill south of the town, and after a pleasant walk of half-an-hour they reached the magnificent rock known by visitors as the "Cow and Calf," where a most extensive view is seen over Airedale in the direction of Otley, Harrogate, York, &c. Here a glowing description of Ilkley and its surroundings was given by Mr. Garbutt and others well acquainted with the locality.

On the return of the party to the Rose and Crown Hotel, a meeting was held, Mr. Firth, President of the Sheffield Photographic Society, occupying the chair. All the names of the gentlemen were announced at the conclusion of a very able and eloquent address by the Chairman, who proposed the health of the members of the West Riding of Yorkshire Photographic Society, seconded by Mr. Dakin, and responded to by Mr. Cook, who, in return, proposed the health of the members of the Sheffield Photographic Society. This found a ready seconder in Mr. Burrow.

Mr. Cook gave a lengthy description of scenes round about the Abbey, and particularly one which he entitled "The Rising Mist."

Mr. Burrow—who is one of Yorkshire's best amateur dry-plate workers—gave a slight *résumé* of his experience in dry-plate work, referring to different abbeys and ruins he had photographed, and kindly offered to lend any of his negatives, which are chiefly 12 × 10.

Mr. Holgate having attested the excellency of Mr. Burrow's plates, Messrs. Dakin, Sachs, Garbutt, &c., addressed the meeting, which was brought to a close at half-past eight o'clock, all expressing their enjoyment with the day's excursion.

PHOTOGRAPHIC SOCIETY OF VIENNA.

At the last ordinary meeting of this Society the chair was taken by Herr Melingo, owing to the absence of the President, Dr. Hornig, at Paris, where he was acting as Austrian Commissioner.

The Chairman intimated that before leaving Vienna Dr. Hornig had had an audience with the Minister of Commerce, and he had great hopes that the question which had been raised as to the transmission of collodion cotton might soon be settled in a way that would give satisfaction to photographers.

Herr Luckhardt showed two negatives and prints from them which had been sent by Herr Brand, of Bayreuth, and read the description of Herr Brand's method of producing these so-called *plastic* negatives, at the same time remarking that he could not recommend it, as he considered what Herr Brand called its advantages to be disadvantageous to the lens. The process consists in producing denser effects by rubbing two drops of glycerine on the back of the lens by means of a ball of tissue paper, so that the picture simply looks as if the subject had moved during the exposure.*

A letter from Dr. van Monckhoven was then read, in which he gave an account of his method of enlarging. The pictures which accompanied his letter were produced from old cabinet-sized negatives that Herr Luckhardt had given him long ago. The pictures were enlarged direct from the varnished and retouched negatives by means of a dyalising enlarging apparatus specially improved for the carbon process, and having a new negative-holder capable of holding a plate from *carte* size to 16 × 18 inches. There are also eight different lenses, which make it possible to enlarge all these sizes of negatives. As soon as the picture has been projected and focussed the focussing-glass is replaced by a frame on which is a sheet of the carbon tissue specially prepared for "hot climates and enlarging." This tissue is much more sensitive than the ordinary tissue, and gives a better result and more delicate half-tones, even with a rather hard negative. Dr. van Monckhoven usually exposes his enlargements until the photometer has registered half a tone, which usually requires about four minutes in the sun. When the print is hard he defers the transferring of it for twenty-four hours. When the print is of medium softness he transfers in seven or eight hours; and when soft, like those made from Luckhardt's negatives, he transfers it at once. He only uses the single transfer process, as he reverses the negative in the enlarging apparatus. The rest of the letter need not be given here.

A discussion followed on the way in which Mr. Gutekunst printed his panorama of the Philadelphia exhibition.

A sample of transparent paper intended to be affixed to the back of a negative for the purpose of receiving the retouching was then exhibited by Herren Mayr and Fessler.

Shortly afterwards the meeting was adjourned.

Correspondence.

BENNETT'S RAPID GELATINE EMULSION PROCESS.

To the Editors.

Gentlemen,—I shall, no doubt, receive in a few days some plates from your Coventry correspondent who is troubled with thinness of gelatine films, and shall be better able then to give him advice.

I have had the advantage of examining the work of several experimentalists, with whom fog from actinic light in the dark room and over-exposure were the only faults, with a single exception, in which latter case the gelatine having become decomposed (ordinary household gelatine having been employed, which is quite unsuitable), the bromide was no longer held in suspension by the gelatine, and excessive thinness was the result. One gentleman dried his plates in the ordinary ruby light of the dark room, which to a certainty will cause fog.

With a plate (twenty-four hours' emulsion) four feet away from the ruby glass, with a fish-tail jet inside the lantern, twenty minutes' exposure to one half of the plate—the other being protected by a card—caused, and will always cause, where only one thickness of the ruby glass is employed, a considerable fog on the plate. It developed, perhaps, half as dark as the sky, as an ordinary negative ought to do when finished.

* This method is a very unwise one. The only effect that such treatment is capable of producing is that of destroying the definition and blurring the picture.—Eds.

There being no need to keep plates or emulsion in the way of what we term non-actinic light for above a minute, and *never* so close as three or four feet, the fault of fogging need not occur. In several instances that I have already named the observance of this precaution has in each case obviated it. If there be no fog, and suitable gelatine has been used—which will seldom decompose, and which, therefore, will always hold the bromide in proper suspension—the image will quickly come up to any intensity, with the shadows perfectly clear.

I should recommend the bromised gelatine being agitated whilst the silver nitrate is poured in a thin stream into it; and I do not think your correspondent need attribute his want of density to the way in which it was poured in, as the other liabilities to error are the most common. I may, however, be able to tell him more exactly after seeing his plates.—I am, yours, &c., CHAS. BENNETT.

August 28, 1878.

[The foregoing letter was received too late for insertion in our last number; but since it was written we have received from Mr. Bennett the further following communication, which possesses great interest.—EDS.]

GENTLEMEN,—The plates that I have received from your Coventry correspondent appear to have been prepared in almost a sufficiently non-actinic light, the first plate which was developed without exposure standing the test of the developer with very little trace of fog. The chief faults, however, were, firstly, decomposition, the silver bromide being strewn on the plates in particles visible to the naked eye. The decomposition had taken place before coating, which is evidenced by the particles having, on coating, settled upon the plate, and caused around each a minute comet, but always in the direction of the corner at which they were drained. The gelatine, apparently, at the time of coating had approached half or three-fourths towards total decomposition.

Where a drying-box is made with the shelves too close, and especially with a deficient current of air as well, the decomposition will sometimes set in after the coating; but on *these* plates the comets in the direction of the dip tell their own tale.

Another fault was in *too close draining*—the film requiring to be double the thickness, at the very least. This, together with the fact of the gelatine (on account of its decomposition) having no longer held the bromide in proper suspension, caused the films to be so transparent that, notwithstanding the advantage of a backing which I applied to them, the halation was so great as to cause the lights to encroach upon the shadows to such an extent as to appear to veil the whole negative, so that the developer could not be kept on long enough to bring up the sky and high lights, as it should do. But although the transparency and attenuation of the film was excessive, and at least three-fourths of the silver bromide was of no service to the emulsion whatever, I think you will see from the plates I enclose that alkaline development alone will bring up these films to any required density. One of my own preparation, which I also place in the box, will, perhaps, show what they are really capable of under proper treatment. You will also, no doubt, notice the difference between an unexposed portion of the film on your correspondent's plates, where the silver is in a visible state of division, and on mine, where the film is without structure or mark.

Your correspondent, I understand, emulsified for three days, which, combined with the extraordinary electrical disturbances lately experienced in England, may account for the decomposition, so long a period rarely having elapsed lately without a storm. It does not follow by any means that such is the cause of the mishap, because the plate I enclose with his had thirty-six hours of emulsifying, and was prepared at the end of June, when, I believe, the electrical storms were almost as bad. I think the way he pours in the silver solution would not have caused the failure, and that, perhaps, if he change his gelatine, coats twice as thick, is equally careful as he has already been about his light, and exposes four to five seconds with the *smallest* stop of his six-inch slow symmetrical lens, he will soon be out of his trouble.

Your correspondent—as I gather from a note accompanying his plates—is of opinion that the result was equally thin whether with the shortest exposure or longest. He speaks of F 16 "instantaneous;" and, again, "portrait lens, full aperture, thirty seconds." This proposition I have quite disproved, as you will see from one negative, where the slide is pulled out an inch at a time. Each exposure was two seconds with the smallest aperture of a slow symmetrical lens, and at the third draw of the slide was over-exposed.

A gentleman once brought me a few similar plates, developed; the lens used was a rapid rectilinear of seven and a-quarter inches focus, No. 3x stop, exposure fifteen seconds. I have not that stop with my lens, so I cannot tell the relation of the aperture to the focus; but I believe it is half-way between full aperture and small ditto. *The negatives were burned up.* A better exposure would, perhaps, have been one-fifteenth of a second, made with a drop shutter with an elongated aperture.

Generally speaking, the exposures that are given lead to half the trouble, and would, perhaps, suit some other processes better than a gelatine emulsion one. Your correspondent, with a full-aperture portrait lens and *flap* shutter, which he also used, would hopelessly over-expose the plates he sent me, unless a considerable restrainer were used. A portrait lens with quick *drop* shutter and a mild developer containing one drop of liquid ammonia would be suitable for a street view or group with 72-hour plates; whilst, again, a marine view would be over-exposed and yield the thin image now complained of, leading the operator to hastily condemn a process to which he had not given fair play. In taking a marine view in May or June, with plates such as I have just been favoured with, I should, if using a rapid rectilinear or rapid symmetrical, certainly stop a little of the light off, and use a drop shutter—by a drop shutter meaning an elongated aperture with elastic spring, which is better than a round aperture passing the lens by simply dropping, as the former plan allows the *full* power of the lens to be acting on the plate longer in proportion than the latter plan.

One hint which I intended to make concerning attenuation of films was that, when your correspondent intimates that he has carried out the formula in every particular, I presume he has not omitted to use distilled water; gelatine—a substance so liable to decompose—could not possibly be kept bottled in water of any other quality. I am particular even to have the flask it has been contained in thoroughly scalded before using again.

I have in the foregoing entered somewhat into detail believing, from the number of solicitations which I have received for a few further hints, that this gelatine process is interesting a good many, and trust these few remarks may dispose of any remaining difficulties.—I am, yours, &c., C. BENNETT.

September 2, 1878.

[Every one interested in the subject of the production of rapid gelatine plates will feel greatly indebted to Mr. Bennett for the care and patience he has displayed in giving such directions as will tend to eliminate all sources of liability to fail with this process. The experimental negatives to which allusion is made in the course of his letter are now in our office, where they may be seen for a few days previous to our despatching them to Mr. Danks.—EDS.]

STEREOSCOPIC TRANSPARENCIES.

To the EDITORS.

GENTLEMEN,—In reply to Mr. Brooks I beg to say that where I consider him to be in error is in the fact that he goes a roundabout way to do what is a very simple matter, and that he advocates a most pernicious plan of printing when a much better one is equally open to him and to others who have anything in the shape of apparatus at all coupled with the smallest modicum of ingenuity. I am aware that most of the stereoscopic transparencies in the market are done by contact printing; but I have given contact printing a fair trial more than once, and I cannot too strongly denounce the practice for many reasons, amongst which the following occur to me prominently at this moment:—

1. Probable damage to the negative, and more than probable damage to the delicate film of the emulsion or dry plate.

2. Loss of sharpness where sharpness is a desirable quality, as it unquestionably is in a photograph that has to undergo the test of being considerably magnified. In camera printing, by the way, the sharpness of the picture can be regulated with the greatest nicety, whether extreme sharpness or the reverse be thought desirable.

3. All the advantages of "combination printing" entirely out of the field; for by no amount of skill or ingenuity could be obtained any of the beautiful effects which have been produced by this means, and by which, I may add, no end of beautiful and novel effects may yet be produced.

I have now briefly given Mr. Brooks the secret of what I consider the main disadvantage of his plan, and I could go on at some length to treat of the matter; but as my paper will, I hope, soon be placed before the public, I am naturally unwilling to anticipate the matter it will contain. I shall, therefore, refer Mr. Brooks to that source for further information.

Mr. Brooks accuses me of narrow-mindedness, because I appear to play the part of judge and jury. If he mean by such a remark that I write with an air of authority I cannot help it. He might as well call a schoolmaster narrow-minded for putting a little scholar right when he sees him doing his task in a clumsy, roundabout way.

Mr. Brooks cannot for a moment have supposed I should care for any rubbishy paper transparencies that happen to be in the market. I cannot even bear the sight of a paper photograph in any shape or form for the stereoscope, and would not have one in my house. Nothing short of a daguerreotype or a glass or gelatine transparency is fit for the stereoscope.

It happens to be gelatine I was thinking of when penning the paragraph referred to in Mr. Brooks's letter; and I need hardly explain to photographers familiar with the advantage of using tissue—for cloud and other negatives—the desirability of using some such tissue for transparencies for the stereoscope, mounted between suitably-perforated cards.

Successful experiments in this direction lead me to speak with confidence on this point, and why this has never been done before has always been to me the marvel of marvels, considering that manufacturers are mostly alive to their own interests. All one has to do is to print, by means of the camera, a transparency on glass, occupying the proper position, strip with gelatine or other tissue, and mount as I have already suggested.

For my own part I do not think a good stereoscopic transparency dear at a guinea; but it is possible I may be too sanguine in saying they can and will be produced at a shilling a piece *one of these days*, for I know Mr. Breese could not produce them profitably at five shillings each. That, however, has nothing to do with it; for Mr. Breese was a genius, and consequently, in all probability, a poor man of business. I have heard him complain bitterly of the way he had been swindled right and left all his life. Still I am quite willing to agree with Mr. Brooks that the lowest limit in price for a good transparency should be half-a-crown.

I may mention, in conclusion, one great advantage in camera printing, and that is that no one with a grain of sense would ever dream of cutting the negative or the transparency, even if the camera happened to be absurdly unlevel when the negative was taken, as it sometimes is in the hurry of photographing breaking waves, cloud effects (where the line of the horizon requires to be shown), balloon ascents, birds on the wing, and other subjects taken at moments more or less exciting.—I am, yours, &c., S. H. Ashley Oakes.

16, *Silverwell-street, Bolton, September* 3, 1878.

EXCHANGE COLUMN.

A new interior background (conservatory) will be given in exchange for a good landscape ditto. Photographs exchanged.—Address, H. Cooper, 46, Louise-road, Northampton.

Wanted, a developing tent on wheels for 10 × 8 work, with fittings, in exchange for a Voigtlander's 10 × 8 orthoscopic lens.—Address, H. Dyball, 3, Lower Notting Hill Terrace.

ANSWERS TO CORRESPONDENTS.

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

Photographs Registered—

Patterson and James, Ramsey, Isle of Man.—*Photograph of Bishop of Sodor and Man; Photograph of Bishop's Court, Isle of Man.*

James Thomson, Liverpool.—*Photograph of Wood Carving*, "*Tam O'Shanter and Souter Johnnie.*"

Marshall Wane, Douglas, Isle of Man.—*Photograph of Andrew W. Gray.*

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

John Frankland (Blackburn).—Thanks. In our next.

Erratum.—In our last number, *Copying Oil Paintings*, page 108, line eight from bottom, for "camera" *read* "canvas."

J. Malcolm.—Gold is precipitated in a metallic form from the solution of the chloride by the addition of protosulphate of iron.

Thos. C. Lord (Huddersfield) encloses a *carte* portrait of a child, nicely enamelled. Mr. Lord practises enamelling professionally.

M. P. J. A.—Metagelatine is merely common gelatine that has been subjected to certain treatment by which it loses its power of becoming jellyfied or solid.

W. S.—It will afford us pleasure to see examples of Icelandic photography. We were not aware that our art-science had any devotees so near the north pole.

Geo. Fisher.—No action can be taken until you have consulted your district surveyor. Lose no time in seeing him, and apprising him of the proposed alteration.

C. M. A.—Of the two lenses the cemented single achromatic is best adapted for ordinary landscape work. For architecture or copying the triple lens will prove much the better of the two.

L. R. M'Lachlan.—If you mean a *carbon* enlargement we should prefer it for such a purpose to a collodion transfer; but if the solar enlargement is to be in silver, then the collodion transfer will be better.

Geo. F. Hunter.—Non-actinic varnish applied to the windows will answer very well; but you would act more wisely in making use of coloured glass. It is now easy to obtain ruby glass well adapted for the purpose.

Obliged Reader.—A solution of bees'-wax in turpentine will answer quite well as an encaustic paste for photographic prints; but the addition of a small proportion of oil of lavender will make it more pleasant to work with.

M. A. (Oxon).—It was in the year 1869 when the meeting of the British Association was held at Exeter. Professor Stokes was president on that occasion, and, if we recollect aright, devoted a large portion of his opening address to optical science.

Green Isle.—A photographic society did at one period exist in Dublin, but it has been discontinued for many years. Seeing that there are numerous able photographers and chemists in Dublin there is no reason why another effort should not be made to form a new society. If such a step were taken the resulting society, if well "officered," would prove one of the best in Europe.

An Apprentice.—A piece of common hard sandstone will answer as well as anything else for roughening the edges of the plates. Such a piece of stone, nicely cut, may be obtained at a cost of a few pence at any leather warehouse or other place where shoemakers' furnishings are sold.

Dr. R. L. Maddox.—We are much pleased to have heard from our correspondent once more. The Almanac has been sent as requested. We trust that Dr. Maddox is about to revisit England, if only to see the progress made by his child—the gelatino-bromide emulsion process.

Constant Subscriber.—We are unable to give detailed directions as to the best method to proceed in mounting prints in quantity for book illustration. If personal application were made to such firms as are in the habit of executing this kind of work some of them would doubtless give the desired information.

One in a Fog—Render the bath neutral by means of a solution of bicarbonate of soda—indeed you may add sufficient of this solution to turn the bath quite of a pale, milky appearance; then filter, sun, and, if necessary, even *boil* the bath solution, which will then be all right. The fogging was caused by impurities in the water with which the bath was diluted.

A. P.—Our correspondent writes:—"1. Will you or some of your correspondents kindly inform me whether Captain Abney's albumen-beer plates are to be had commercially? If so, where? I wish to try them, but have at present no facilities for preparing them myself.—2. Will some one favour me with the names of some British photographers, amateur or professional, residing in Spain?"——In reply to the first query: we are not aware of any one who supplies plates prepared by the beer and albumen process. They may be prepared so easily that "A. P." ought to do so himself. Will some correspondent please reply to the second query?

J. Ekralc.—1. No; there is no necessity for mounting the lenses otherwise than in strict parallelism to each other. Convergence, in such a case, would lead to inconvenience.—2. To obtain a stereoscopic picture of a "ghost," let the group be arranged in a natural position, with attitudes and expressions suited to the occasion. Now give three-fourths of the full exposure required, and, cautioning the sitters not to move, cap the lenses and make the figure that is to personate the ghost take his or her place in the position assigned; then uncap the lens and give the remaining fourth of the exposure. When developed the "ghostly" figure will be well defined and distinct, although transparent to such a degree as to enable the objects on the other side to be visible through the figure.

Quarter Deck.—Several years ago—probably now over twenty years—an invention was made by Professor Piazzi Smyth by means of which a telescope, or a photographic camera, could be retained in a perfectly steady manner for several minutes on board of a ship even when the ship was being heaved and tossed by the billows. It was based on the principle of the gyroscope, and consisted of a heavy wheel that was caused to rotate at the speed of about eighty revolutions per second, the frame upon which it was supported having been accurately balanced on gimbals like a mariner's compass. When in motion and supported in this manner the large rotating wheel is absolutely insensible to any movement which the outer frame may experience at right angles to the plane of rotation. It is only necessary that this plane shall in the first instance be placed horizontally to ensure a table placed upon the inner frame of the spinner being entirely protected from all the possible angular movements of a ship; and a telescope placed upon such a table, and once directed to a star, has kept it in the field without the aid of a hand, even when the ship was pitching and yawing heavily. In an instrument of similar construction you will find the means of solving your problem.

Paragon Mounts.—From Mr. Richard Crowe, Liverpool, we have received specimens of his "paragon mount." This consists in printing by lithography and in a photographic tone of colour a ground upon the *carte* mount, the said ground being either quite plain or having ornamental corners. The print having been trimmed to an oval or other shape is pasted upon the mount, the gloss of the albumenised surface of the former contrasting with the matt of the latter.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.
For the Week ending September 4, 1878.
These Observations are Taken at 8.30 a.m.

August.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
29	29·66	99	73	59	59	61	SE	Overcast
30	29·43	99	70	59	58	61	W	Cloudy
31	29·60	98	68	58	58	61	W	Overcast
Sep. 2	30·26	100	69	55	54	59	NW	Cloudy
3	30·26	106	74	58	58	62	W	Cloudy
4	30·17	—	—	55	58	61	E	Hazy

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THE BRITISH
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No. 958. Vol. XXV.—SEPTEMBER 13, 1878.

A FEW WORDS ON THE PRODUCTION OF TRANSPARENCIES.

Mr. W. Brooks's paper on *A New Method of Making Glass Transparencies* has elicited the criticisms of gentlemen equally interested in that delightful branch of photography, and the discussion which has been going on in our correspondence columns has turned principally upon the relative merits of contact and camera printing. With the commercial side of the question we have at present nothing to do. The price at which a transparency can be produced or will find a ready market is a matter resting entirely between the manufacturer and the public; and though we can fully agree with all that has been said as to the desirability of popularising this most perfect of all styles of photograph it is beyond our province, as it is against our rules, to interfere in such matters.

But the subject has other bearings equally as important as the commercial, in which the amateur producer is more especially affected; and it is in this direction we wish to follow up the discussion and to point out in what particular respects the rival methods of production are most likely to recommend themselves. A careful perusal of Mr. Brooks's article will show that the method he there proposes is put forward with a special object, namely, to simplify the operations when performed upon a small scale or by the amateur. Mr. S. H. Ashley Oakes, however, considers the new method a "roundabout" one, and, looking at it from one point of view, perhaps it is; but so is the plan of cutting the negative, and so more emphatically is the camera method to the small producer, especially if unfamiliar with the requisite manipulations.

The two methods of printing in the camera and by superposition are essentially different in character and in application, each possessing its own special advantage; but we cannot help thinking that Mr. Oakes, who is an enthusiast in a particular branch of transparency work, has lost sight of the real gist of the matter in adopting the line of argument he has done. It is beyond the possibility of denial that for combination printing the camera is a *sine quâ non;* and even for plain stereoscopic work on a large scale it affords facilities which contact printing does not, and cannot, attempt to compete against. But to the ordinary amateur it is a question whether the advantages thus acquired are sufficient to recompense him for the extra outlay in special apparatus, and for the extra trouble involved in the adoption of a comparatively unfamiliar system of manipulation.

Let us glance briefly at the advantages accruing from the use of the camera, setting aside the class of pictures which are so intimately associated with the name of the late Mr. Breese, and which few, if any, photographers—amateur or professional—have succeeded in imitating. First of all, there is no necessity to cut the negative, the operation of reversing the two pictures being performed in the camera. Secondly, we have the power of enlarging or reducing the picture as represented in the negative in order to include more or less of the subject in the fixed bounds of the stereo. transparency. If we add to these the somewhat ambiguous recommendation mentioned by Mr. Oakes in his last communication—"the possibility of obtaining extreme sharpness *or the reverse*"—we have exhausted the list.

With regard to the first advantage a great saving of time and trouble will accrue where a large number of pictures have to be produced, and a single adjustment of the camera will ensure the absolute uniformity of the results as far as regards the distance of the centres; but most amateurs, we imagine, would prefer some simple plan—such as that proposed by Mr. Brooks—or would even be content to spend a little more time in adjusting each half of the transparency separately, rather than "build" a camera for the express purpose.

The second recommendation—the power of enlargement or reduction—might possibly be useful in some cases; but seeing that a stereoscopic picture, whether on glass or paper, must conform to the same rules as regards size, we fail to find any reason for the necessity of any departure from the scale depicted in the negative. We should imagine that any intelligent person taking a negative for stereoscopic purposes would select his point of view in such a manner that the proper amount of subject would be included within the limits of a stereoscopic slide; and if such negative be available for paper printing it would be equally so for a glass picture. Of course, cases may arise where it is impossible, from optical or other reasons, to include the proper amount of subject in the space at disposal, and it is in these exceptional instances that the benefit of the camera would be chiefly experienced.

We do not exactly catch Mr. Oakes's meaning with regard to "extreme sharpness or the reverse," especially when we look back at his preceding sentence, in which he speaks of the desirability of sharpness; but if, under any circumstances, the "reverse" be the case, surely it is an easy matter to obtain any degree of "woolliness" by separating the negative and the prepared plate in printing by superposition.

Against the few advantages we have named we may place as a set-off, first, the necessity for special apparatus; for we cannot agree with the statement that "anything in the shape of apparatus at all, coupled with the smallest modicum of ingenuity," would lead to satisfactory results. Rather, we should say, the difficulties would be increased. Then the matter of illumination forms a serious obstacle. In daylight it is comparatively easy to "rig up" a simple reflector to throw a tolerably evenly-diffused light upon the negative; but very many amateurs are not so situated as to be able to utilise the hours of daylight during the winter months (when transparencies are mostly produced). Reduced to artificial light, a condenser becomes almost a necessity if the best results are required; but whatever means be adopted to secure even illumination it means extra trouble, vexation, and uncertainty.

Another objection will be found in the greatly-increased exposure required in camera printing, even when employing the most rapid plates. This alone will form a serious consideration to the amateur, whose time available for photographic pursuits is usually limited, and who will, in the majority of cases, prefer contact printing with its few seconds' exposure to an ordinary gas flame or paraffine lamp. Finally: the quality or character of the negative forms a far more important element in camera printing than is the case with the alternative method. Good results may be obtained by the latter with negatives of widely-different character; but the best results in the camera are obtained with negatives almost too thin for paper printing, and very great care and skill become necessary to produce a pleasing picture if a plate of more than ordinary density be in question.

Mr. Oakes speaks of contact printing as "a most pernicious plan," and divides his impeachment of it into three chief heads, with only two of which we are at present concerned. First, he mentions the probability of damage to the negative, and more than probable damage to the sensitive film. This will depend very much upon the quality of the glass used, and upon the exercise of care in removing any dust or "grit" which may become attached to either surface. In a great variety of experiments with different dry plates, extending over nearly two years, we have been in the habit of using one particular negative, which we keep as the standard by which to test the qualities of the different processes. It is upon the ordinary crown glass employed for landscape purposes, neither better nor worse than the ordinary run of such glass, and received a single coat of negative varnish such as we are in the habit of using. It has probably been in contact with some hundreds of dry plates, but it does not yet show signs of much damage or ill usage. As regards damage to the sensitive film there is, perhaps, more reason to speak, especially with washed emulsion ones unprotected by any preservative; still, with a little care, no danger need be anticipated even on this score. It is easy, however, to apply a preservative, and if a dilute solution of albumen be selected for the purpose there will not be the remotest risk of damage.

In the matter of sharpness the quality of the glass will also have a great deal to do with the result. Most crown glass has a concave and a convex side, and if two concave surfaces be brought together there will no doubt be an appreciable loss of sharpness. But by noting the curve of the glass (if any) and acting accordingly the defect may be reduced to a minimum; and if the printing be performed at a little distance from the light it will require a very critical eye to detect any falling off in the definition. The thin glass generally employed for transparencies adapts itself so readily, under slight pressure, to the curvature of the thicker negative that very little cause of complaint remains if the printing be performed in an intelligent manner.

The convenience to the amateur of being able to use the same plates he is accustomed to work out of doors and to dispense with any additional apparatus will, we think, ensure for contact printing a longer continuance of favour than Mr. Oakes seems disposed to accord to it. In saying this we do not wish to appear to undervalue the camera, which, as we have before stated, is indispensable for some descriptions of work, and, under certain circumstances, is no doubt preferable to the rival method. We shall be glad to see Mr. Oakes follow up his crusade in favour of high-class stereoscopic work; but trust that he will not allow himself to be prejudiced against the genuine efforts of others in a similar though not identical direction. We are all indebted to Mr. Brooks for his valuable paper, which, even from Mr. Oakes's point of view, scarcely deserves the wholesale condemnation he has heaped upon it.

DRYING PRINTS.

The apparently very simple matter of drying albumenised paper prints is by no means the easy and straightforward thing that it appears, and, as we do not remember details of any amount of fulness having been given on this subject, we purpose considering a few points of interest that arise during this by no means unimportant operation.

Most large printing establishments have methods of their own—some good, some bad—and others no method at all beyond a haphazard way of getting through the work somehow. Whenever a piece of work has to be performed by a number of hands allowance has to be made for the fact that the principal cannot always overlook its progress, and all systems, whether designed on a large or small scale, must allow for this fact. Thus, the chemist in his laboratory often invents new processes of manufacture which, if carried out on a large scale, would enable him to make a fortune. He patents his discovery perhaps, and finds too late that the process, which in his own master hands worked admirably, breaks down when submitted to the rough test of manufacture by the comparatively unskilled hands of the average workman, who will not take special pains to produce a certain result.

And so in photography. How many careful, conscientious workers—beginning at first with no external help, and able to point with pride to their early efforts, perhaps a dozen years' old, showing no trace of fading—in after years, with their reputation made, find their more recent pictures (produced in thousands for each former unit), with the best paid help and with the aid of the best apparatus and most perfect general arrangements, show signs of fading before they have been many years sent out of their hands! The truth is they have not been able to be in every spot at once, and some one of the helpers has been careless or worse, and so upset every calculation and rendered worthless the best system.

In nothing could a better exemplification of this be offered than in the drying of albumenised prints. One of the commonest methods is to dry the print between sheets of blotting-paper. Some day something happens—hypo. left about instead of being cleared away; an accidental and unnoticed stoppage in the water supply; in fact, any one of the hundred unexpected incidents of the kind which will occur, and a few half-washed prints will in consequence get placed between the blotting sheets, and leave behind a store of hypo. to injure an unknown number of succeeding prints dried between the same sheets.

The best plan we have seen adopted for drying prints by the sheets is as follows:—The prints, taken out of the water one by one, are laid upon well-washed pieces of linen till each "sheet" is covered; another sheet is then placed on the top to be covered with prints, followed by another sheet, and so on till all are arranged. A little gentle pressure then removes the greater part of the moisture, and the prints are now placed between sheets of blotting-paper for a final drying, where they are left till ready for sorting or cutting.

Some photographers use linen cloths only, others merely blotting-paper or board. Now, this double-drying plan carried out in its integrity is very good, but most particular care has to be taken that the routine is thoroughly followed day after day. No holiday time and short hands, no press of work, no oversight, no neglect in consequence of a bad printing day leaving few prints to attend to, can be permitted to interfere and allow a batch of prints to be left in the sheets over the day, or everything will go wrong.

We know of a case where this system was practised, when the principal personally overhauled the sheets one day and found a few score of damp prints that had lain forgotten between the lower sheets for several days—a state of things which could scarcely help ending disastrously for the prints in course of time, if not at once. The prints had been put aside one day and left, and then been forgotten. We have narrated this incident as one of the many possible ways in which this system might fail. Therefore we think that *every day* the principal or a responsible subordinate should see, when this method of drying is pursued, that every linen cloth or blotting-paper or card, whether used or not, should be hung up to have an airing and to dry. In winter and damp weather this is especially desirable, for the paper sheets would be permanently damp if not separated and dried, and the evil effects that might follow from such a result need not be enumerated; and of course periodically the linen cloths should be well washed and rinsed in clean rain water.

Perhaps the most popular method is to hang up the prints by American clips till quite dry, and it is one which has much in its favour, the only foreign enemy being dust, and that can easily be guarded against if there be suitable space at command. One chief drawback to the use of the clip, beyond the space required for hanging, is the liability of the prints, if on paper, having a gloss at all beyond the average, to show when quite dry a multitu le of fine cracks, which gives the mounted print a very unsightly appearance. There is no remedy for this except taking the prints down before they are quite dry, or drying between sheets.

We have recently seen, at the studio of a gentleman whose methods of working we have before alluded to, a modification of the plan of drying between sheets which seemed to reduce the possibility of ill results through carelesness to a minimum. With a description of it we will close this article.

The prints were placed as before described between the linen cloths, and when all were collected in a heap it was turned over and the lowermost one first submitted to the next process. We would here note that in some establishments it is customary to supersede the final drying between paper by placing the prints before a fire and so drying them off quickly—a very good plan in many respects.

In the studio in question this plan was formerly adopted, but it was found that so much time was lost in "watching" the print as to interfere seriously with the general routine of the establishment. Instead, therefore, of taking the prints to the fire a gas drying apparatus was arranged, and of such a simple nature that it could not get out of order. A sheet of tinned iron was hinged to the wall near the sorting cupboard, and under it was placed a star of gas jets at such a distance as to make the plate hot, and yet not so hot as to scorch the prints; on this they were dried most easily and quickly, and no time was lost. The plan has been in operation for nearly a year and is much liked. It has been found that the best plan is to cover the tin over with a piece of tissue paper (not tracing paper) and place the prints upon it *face downwards*, as they then dry much flatter. We may have something to say on a future occasion upon sorting, cutting, and mounting prints.

REMINISCENCES OF A VISIT TO DUBLIN.

No. I.

When in Dublin attending the recent meeting of the British Association for the Advancement of Science we made a few jottings, which may prove of interest to our readers.

The number of professional portrait photographers in that city is very great. Sackville-street and Grafton-street, more particularly, contain numerous studios. Taken as a whole the work produced is excellent. In several show-cases we found pictures of a quality we have never seen surpassed either in London or elsewhere in the United Kingdom. The Dublin photographers do not seem backward in adopting such improvements as from time to time are brought out. The sight of a Cadett's pneumatic shutter suggests the reminder that when visiting the studio of Mr. J. V. Robinson (Millard and Robinson), Sackville-street, that able photographer showed us in his own practice an improvement he had adopted upon the method we described of grasping the air-ball in the hand and giving it a squeeze when the exposure was about to be made. Mr. Robinson's method was much simpler and better, as it left both hands at liberty. He merely placed the ball upon the floor, and, putting one foot on it, he gave it the desired pressure when it was necessary to uncap the lens. We have since then tried this method of exposing with great advantage. Mr. Robinson does not confine himself to portraiture—a fact attested by several charming landscapes of local scenery we saw in his show-case.

Having a vivid recollection of what Mr. Lesage wrote to us several years ago with regard to the effect of some blue glass sashes in his studio, we made a point of calling to see them. We found that his studio lay in a S.E. and N.W. direction (our remarks here must be accepted as only *approximately* accurate, being based upon the position in which we saw the sun one afternoon). The sitter faced the south-east, and of course during the forenoon the sun would beat upon the sitter, who was placed at the north-west end. But on the right hand of the sitter the room was fitted with supplementary interior sashes filled with blue glass, one side of which was ground glass. Now, in taking a portrait, if the sun were obscured the plain glass of the studio windows would suffice for the admission of light, because the sitter would be merely illuminated by a bright, cloudy sky. If, on the contrary, the sky were cloudless and the rays of the sun likely to interfere with the equanimity of the sitter or the perfection of the lighting, the movable sliding sashes could be utilised, and blue ground glass interposed between the sun and the sitter. A southern light is a bad master, but may prove to be a most excellent servant when means like those here briefly described are employed to hold it in check.

Having seen an excellent portrait of a "subject" very difficult to take, obtained in the studio of Messrs. A. and G. Taylor, of London and numerous other towns and cities, including Dublin, we were induced to visit their establishment in Stephen's-green, adjoining Grafton-street. This firm here, as well as elsewhere, appears to do a very large business in enlarged coloured photographs, many of which we noticed were ready to be framed and despatched to their respective *clièntele*. Examining these paintings somewhat crucially we saw that the faces were to a great extent finished with transparent oil pigments, which accounts for the excellent manner in which the likeness is preserved. The studio is so constructed as to enable the sitter to be placed at either end, and during the short period of our visit we saw negatives taken which, as respects their fine light and shade as well as posing and other artistic attitudes, we have never seen surpassed elsewhere.

In the show-case of one photographer we saw, ranged side by side, portraits in silver and in carbon—of course from the same negative. The former were indicated as being evanescent; each of the latter were, on the contrary, to be considered a "joy for ever." Now, after all that we have written in support of carbon printing and its peculiar virtues, no one will be likely to suspect us of proving false to our colours when we say that if it had not been for the peculiar technical knowledge of the specialities of the two methods of printing we possess we should, as a mere matter of beauty, have given the preference to the fading silver prints rather than to the enduring carbon ones. We are not in a position to say how long the prints referred to have been exhibited in the show-case; but if the time has not been *very* great, then we should say *(more Hibernico)* that the photographer must "kick up a row" with his printer for his carelessness in allowing prints to be passed showing such unmistakable tokens of sulphurisation as one or two of these did. On the other hand, his carbon man must be taught that in the eyes of an unreflecting public permanence alone will form but a poor substitute for other qualities expected in a photograph.

At the railway station, while *en route* for the beautiful suburban town of Kingstown, we saw a show-case which struck us as being exceedingly effective. It was of somewhat large dimensions and backed with a fabric—velvet, if we mistake not—of a dark maroon colour, puckered up in a peculiar yet pleasing and artistic manner. In the cavity between each "pucker" was a *carte* portrait, and, forming a centre-piece to the whole, was an elaborately-painted enlargement in a gilt frame. Having never seen anything of this character in London we here direct attention to it for the benefit of any who may desire to take advantage of the suggestion.

We have mentioned Kingstown. We were never more surprised than at the discovery of the very low state of photography in that charming town, which is only a few miles distant from the Irish metropolis. It may be that there are more photographers there than the *very* few whose "establishments" are situated in the principal commercial street of the town; certainly during our visit we did not see any others. In the window of one of these temples of art had lodged such a quantity of dust as provoked the remark from a professional friend in our company that it was "at least an inch thick." This we unhesitatingly assert is not quite in accordance with fact; we, at anyrate, did not think that there was quite such an aggregation of "matter in the wrong place" as this. There was, however, very much room for improvement. The public like to see a shop interior neat and tidy, and, other things being equal, will patronise such a place. Judging from a circular which was put into our hand, two of these "artists," whose "galleries" are next door to each other, appear laudably desirous of not leaving the public in ignorance as to whether it is Codlin or Short that is the friend. With the twofold end in view of giving one of these "artists" a greater amount of publicity than he is likely to obtain by the distribution of handbills at his "studio," and also of enabling such of our readers as, being placed in similar circumstances, may be desirous of a model upon which to base their own appeals to the public, we here append, *verbatim et literatim*, the circular in question:—

Clarendon's Photographic Gallery, 94 Lower George's Street. Kingstown. No connexion whatever with the house next door. In consequence of mistakes made by persons wishing to patronize Clarendon's Gallery, J.N.C. respectfully requests his Friends and the Public to observe that he keeps no BOYS watching about the doors of his GALLERY. and particularly desires his Friends and the Public not to be led away by "URCHINS" on the LOOK-OUT FOR CHANCES. The Name and Number CLARENDON.94 are plainly written over the doors of J.N.Cs, Establishment, which he hopes his Friends and the Public will not mistake as he is most anxious that their Cartes should be taken in a Superior Style and which can only be done at J.N.Cs, *Long Established Gallery* All kinds of Photographs taken including the OLD POSITIVE now puffed up by others under the new name of "FERROTYPES"

The statement in the concluding sentence is doubtless an unkind cut at his ferrotyping neighbour; still, Mr. Clarendon speaks no more than the truth in asserting the identity of the "old positive" with the modern "ferrotype."

RECENT PATENTS.

No XV.—BINOCULAR OR SPACE PHOTOGRAPHS.

This is a patent obtained by Carl Heinrich Lehmann, of Stargard, Pomerania, for "an improved method of taking binocular or space photographs."

Previous to giving the specification—in which, to prevent any mistakes, we prefer to adopt the phraseology, pure and simple, of the patentee—we may state that it consists of a method of taking ordinary single pictures by means of a large lens, which shall be all stopped up with the exception of two apertures at its margins.

It is well known to opticians that a body, if seen with but one human eye, appears as a plane, and not as a solid or body resting in space. The latter impression we receive only by catching with the other eye other points and planes of the object which the one eye cannot behold.

In the art of photographing no method has been hitherto known or used which, according to theory and experience, produces on the eye in looking at a photograph an effect or appearance of objects being seen with two eyes; or, to use another expression, as standing free in space, or in relief, and allowing an estimation of the space between two points more or less distant from the spectator.

It is required or expected in photographic pictures, more than in any other kind of pictures, that they should produce upon us the impression of reality, or of an object seen with both eyes. It will be necessary before all that the picture should not contain any lights, shadows, outlines, and perspectives which would not be seen with two eyes, and if such be found, nevertheless, they may be called adulterated lights, shadows, outlines, and perspectives.

By the method hitherto employed in photographing and other uses of the *camera obscura* (which method consists in either permitting the rays of light to enter through the whole surface of the object-glass, or through such part of the same as does not divide the entering rays) such adulterated lights, shadows, and the like, must be produced; or if the aperture for the light be very small, and the distance very large, the object will appear as if seen with one eye only. If, however, an object-glass of larger size, quite uncovered, should be used, lights, shadows, outlines, and perspectives will appear on the picture as they should be seen by one eye with a pupil as large as the object-glass, but such an eye would not see at all.

If, for instance, a photograph were to be made by a sufficiently long or a sufficiently narrow tube placed at the lever of the two eyes, and perpendicular upon the line between the two eyes, so that neither the right nor the left eye could look through the whole aperture of the tube, the averse aperture should not be visible upon the picture. The picture, taken with the object-glass uncovered, will nevertheless show the impression of the light of the full aperture. This light I call adulterated as well as the perspective.

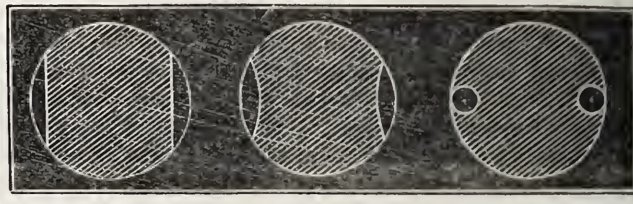
These adulterated lights and other effects I avoid by my improved method, which involves the covering of the object-glass as herein described. I make the light of the object fall upon the receiving plate in the same manner as the rays of light of an object seen enter through the two eyes and unite in the impression of one picture.

The lens apparatus, combined with the *camera obscura*, may be well compared to the human head. The object-glass represents the eye, and the said improved method chiefly consists in giving the effect of two eyes to this one eye by covering the object-glass in such a manner as to make the light enter only through two separate apertures. Hence I term the pictures thus produced "binocular pictures."

Any particular form of the two apertures allowing the light to enter is not essential, and any suitable material may be used for those parts of the object-glass through which the light is not allowed to pass.

In the accompanying drawing, *figs.* 1, 2, and 3 show in what manner the object-glass may best be covered. This method of

FIG. 1. FIG. 2. FIG. 3.



covering the object-glass may be applied to glasses of any size. With small object-glasses care must be taken that the case projecting to shade the object-glass does not too much limit the scope of view. This difficulty may easily be prevented by suitably widening the case.

The picture will become the more perfect the more nearly it is made in accordance with the position and construction of the human eyes. For this purpose it is best to use an object-glass of more than two and a-half inches in diameter. If possible, a space of two and a-half inches (the average distance between the pupils of the eyes) should be covered upon the object-glass, and on both sides of this untransparent space ample space should be left to admit sufficient light to produce the picture. If I place an object-glass thus prepared in opposition to an object in the same place which my eyes had previously occupied, the rays of light, equal in strength and direction, having before entered my eyes, will now fall into the eyes of the object-glass. The picture thus produced will in consequence make exactly the same impression with relation to the proportions of size and distance as if the object were beheld with the living eyes.

Suppose I should place before the apparatus a globe on which the degrees of length and breadth had been marked: if the picture show the degrees from 1 to 180, or more, the globe must obviously be smaller than two and a-half inches in diameter; on the contrary, it must be larger, or the distance from the object-glass must be less in the same proportion as a smaller number of degrees appear upon the picture.

The size of an object is not estimated by numbering the degrees, but the impression of it is received by the size of the angle formed by the axis of the eyes in fixing an object.

With the pictures produced by my improved method the effect will be the same. The object of the photograph will always appear more natural and more agreeable to the eye than in ordinary pictures. My said improved method may be applied in any photographic apparatus, no essential modifications of the usual proceeding being necessary. Photographic pictures produced by my said invention may be readily distinguished from ordinary pictures.

Having thus fully described my said invention and the manner of performing the same, I wish it understood that I claim the improved method of taking or producing photographic pictures or photographs by using a photographic apparatus with its object-glass prepared or partially covered by any untransparent fabric or substance, leaving two separate apertures of convenient form to permit the light to enter, and whereby I obtain photographic pictures, which I term binocular pictures, as above described.

We have only at present to remark that if Herr Lehmann attempt to take single photographs by the method proposed, in the expectation that they will possess stereoscopic relief, he will find himself greatly mistaken. This dream was indulged in by a few in the early days of our art-science; but for optical and physiological reasons, into which we shall not here enter, it was speedily discarded.

Among the various mechanical devices for effecting the exposure of a plate in the camera without the sitter being aware of the fact is one which has been brought under our notice by Mr. William Weaver, High-street, Runcorn. It is evidently carefully thought out; certainly it is most ingeniously contrived, simplicity being a leading feature throughout. A very light shutter slides up and down between two deep grooves in a frame fixed *inside* of the camera and close to the front. Although light, this shutter still possesses a degree of weight sufficient to enable it to fall by the force of gravity to the bottom of the frame, in which position it covers up the lens, effectually preventing the access of light to the interior. A thin piece of flexible silk string is attached to the shutter, providing the means by which it is pulled up. By the aid of a small bent tube, capable of being pointed in any direction, and placed in the top of the camera, the string can be conveyed in any desired direction, either behind or to one side or the other. While the focussing is being effected the shutter is pulled up, thus allowing free access of the light through the lens to the ground glass. This having been done the shutter is dropped, the dark slide containing the sensitive plate inserted, its shutter withdrawn, the lens uncapped, and a favourable moment awaited when the exposure may be safely made. This is done by pulling the string, which may be either only a few inches or a hundred yards in length. Of course it is done without the attention of the sitter being attracted, for the string is very thin, and it may be pulled without the sitter being made aware of it, and also without giving a jar to the camera. After a sufficient length of exposure has been given the string is eased and the shutter drops. The camera which has been submitted to us for examination is that in every-day use by Mr. Weaver. Having employed it constantly since the beginning of June he is enabled to speak as to the efficient manner in which it does its work. So far as we can see this will prove a most useful addition to the mechanical appliances by which photography is becoming more and more simplified as regards at least its manipulative details. In Mr. Weaver's lens —a *carte* portrait combination—we also find a drop shutter ingeniously fitted. A slit, like that in use for the insertion of Waterhouse diaphragms, is cut into the lens-hood, just in front of the anterior lens of the combination; but this slit is cut into both sides of the hood, so as to permit of an oblong steel shutter passing through it—the shutter, of course, containing an aperture the size of or larger than, the diameter of the front lens. This provides for an instantaneous exposure being given.

It is rather amusing to notice how, in the course of photographic practice, different experimentalists move round and round in circles, as it were, like a straw in an eddy, continually passing and repassing the same spot without exactly touching it. At the last meeting of the Photographic Society of France (the report of which we are compelled to hold over till next week) M. Fabre, of Toulouse, made a communication on the subject of precipitated emulsions. That gentleman has found, as many others have done, that an emulsion which works to perfection before precipitation is frequently found to be perfectly useless afterwards. This result he attributes to the action of the hot water used in precipitating, which, by the rapid causes the silver bromide to escape and agglomerate into coarse, sandy volatilisation of the ether, bursts the cellules of the precipitate and particles. Without disputing the correctness of this theory it may be remarked that the same result occurs when *cold* water is used, and when there is no such *bursting* of the particles of collodion. M. Fabre goes on to say that some writers have asserted that the coarse particles of bromide thus formed have parted with a portion of their bromine, and consist in reality of sub-bromide. We do not recollect to have seen such a theory propounded; but it is satisfactory to find that our author is ready to combat it, holding that the change is merely a molecular one. He then proceeds to show how the trouble may be prevented. It arises, he believes, from the power of resistance of the cellules of the pyroxyline being insufficient to overcome the tension of the ethereal vapours, and shows that by adding a larger quantity of *coton resistant* the defect may be considerably modified. However, he gives us an alternative of two methods by which a precipitate may be formed, which, after re-solution, will behave in identically the same manner as before precipitation. The first consists in "concentrating" the emulsion before precipitation by leaving the stopper out of the bottle for twenty-four hours. The second and preferable plan is to pour out the emulsion into a dish, and when the surface has solidified it is to be cut up and treated with an equal bulk of warm water, the flocculent mass being broken down with a spatula and transferred to a precipitating glass for collection. It is then washed and dried in the usual manner. This appears to us to be a decided step towards the old system of working. Washing the emulsion was superseded by precipitation. Precipitation has had its day—has been weighed in the balance and found wanting—and now we have one of its own friends recommending at least a partial return to the older style. We have no doubt that it will be found to be an improvement; but why adopt half measures?

THE DARKENING OF PAPER ON EXPOSURE TO LIGHT.

Few processes have been subjected to such a series of adverse criticisms as the so-called carbon or pigment process. No sooner has it thoroughly recovered itself from one series of attacks than it is assailed with another. We now hear a great deal about transfer paper becoming more or less discoloured by exposure to light, and hints are dropped that existing carbon prints must be looked on with suspicion, in consequence of a possibility that their paper basis may darken by a long-continued exposure to the action of light. Notwithstanding all this we do not hear of the very early carbon prints becoming yellow or dark in the whites.

Cellulose, or vegetable fibre, does not darken on exposure to light, provided it is in a pure state and is perfectly freed from the incrusting matter which accompanies it. This is true, whether the cellulose is obtained from cotton, linen, hemp, jute, esparto grass, wood, or other material. Some vegetable fibres—such as cotton and linen—are freed from their incrusting matter with great ease, a comparatively slight treatment with detergents and bleaching agents being sufficient to effect this and to lay bare the true vegetable fibre or cellulose. In the case of linen and cotton the work of the paper-maker is much facilitated by the fact that the raw material has had a little knocking about in the world before reaching his mill; and the practical outcome of the matter is that paper made from linen or cotton rags does not become darkened by exposure to light—at least not to any injurious extent.

At the time when the early carbon prints were made almost all high-class papers were made exclusively from rags; and as this paper consisted of nearly pure cellulose, prints on it retained their whites intact.

While carbon printing has been developing itself the paper-making industry has undergone considerable changes. I pass over the use of esparto grass as a paper-making material, and consider that which has long been the dream of the paper-maker, namely, the economical manufacture of a good paper stock from wood. It is possible to so purify and clean the fibre of wood as to remove the whole of the incrusting matter, and to leave pure and white cellulose which shall be capable of retaining its colour when exposed to the action of light; but it is much easier to remove a part of the incrusting matter and to bleach the rest. Paper made from this imperfectly-purified wood pulp or fibre becomes gradually dark on exposure to light, and this in proportion to the amount of incrusting matter left unremoved. It is probable that a wood paper so far purified as to be quite capable of resisting the action of light would cost more than a rag paper of similar quality.

Orioli, who has contributed much to our knowledge of paper-making materials, when writing about ten years ago, stated that wood stock which has been treated with chloride of lime (bleaching powder) tends to become yellow, and that which has been treated with mineral acids tends to become reddish on exposure to light, while if iron be present a darker tint arises.

Let us now pass over the methods which have been devised by Orioli, Houghton, and others for the treatment of wood pulp, and consider the actual state of the case as it stands at present.

In Austria and Germany numerous pine forests are cultivated (some of the latter belonging to Prince Bismarck) solely with a view to making wood paper and paper stock, and much of this material is imported into England. The wood paper of the present day possesses excellent general qualities, and its colour is good; but, unfortunately, it is not sufficiently purified to resist the action of light. This is well illustrated by an inspection of the exhibits of wood stock and wood paper shown in the Paris Exhibition, as most of these display signs of darkening where the light has acted.

I recently noticed a curious illustration of the darkening action of light on pine wood. An auctioneer's bill had just been removed from the board on which it had been mounted for exhibition, and on the board was a clear and distinct photograph of the printed bill, as the light shining through the thin paper had darkened those parts of the wood which were unprotected by the opaque printing ink. No doubt a recently-planed board had been used for mounting the bill, as the contrast between the light parts and the dark parts was considerable, the altered parts having much the same tint as ordinary York paving-stones, and the date of the bill showed that the action had taken place quickly. In this case, it may be noted, the wood fibre was denuded of none of its sensitive incrusting matter, while the worst commercial samples of white wood-paper only contain a small proportion of this alterable material.

Cellulose, or vegetable fibre, when pure and free from incrusting matter, is not darkened by being immersed for a few seconds in strong sulphuric acid or in ordinary nitric acid; but the presence of incrusting matter generally gives rise to a discolouration, which often indicates the source of the fibre.

Now for the practical application of the foregoing notes. Although a very bad paper will sensibly darken when exposed to light for a few days, it is obvious that a long exposure—say twelve or eighteen months—will be required in order to thoroughly demonstrate the suitability of any given sample for the manufacture of transfer paper. In the meantime, however, transfer paper must be had, and I think that manufacturers who take the following precautions will be quite safe.

In the first place, they should require a guarantee from the paper-maker that the material supplied is made entirely from rags; and they should select a paper which is naturally white—not a yellow paper which has been vamped up with a blue pigment. Rag paper, I repeat, is seldom dangerous, as the incrusting matter is easily removed by the paper-maker; and, even if it were not entirely removed, the consequence would not be serious, as imperfectly-dressed cotton or linen fibre is by no means comparable to defectively-prepared wood paper, as far as regards sensitiveness to light.

In the second place, the manufacturer of transfer paper would do well to test his raw paper in the following manner:—About an ounce should be boiled for half-an-hour with a two-per-cent. solution of sodium carbonate, and after the pulp thus obtained has been well washed it should be soaked for an hour in a one-per-cent. solution of hydrochloric acid. After this it should be thoroughly washed with hot water. A little being now collected on a fine wire net and dried we have a sample of paper similar to the original, but free from sizing materials. Pieces of this can now be tested by immersion in cold sulphuric acid and cold nitric acid respectively.

The above is the best advice I can offer at the present moment; but experiments are now in progress which will, probably, throw further light on this subject. THOMAS BOLAS, F.C.S.

NOTES ON PASSING EVENTS.*

BY A PERIPATETIC PHOTOGRAPHER.

HAVING read what has been written in a recent number regarding the taking of photographic views of the interiors of caves by means of paraffine lamps, I inquire if no practical means have yet been devised by which the singularly-actinic energy of incandescent magnesium may be made use of for such a purpose. It is well known that the light emitted from this source possesses a greater amount of chemical energy than that from any other source whatever, rendering it pre-eminently *the* light for photography. The material itself, too, is of such a price as to render this cheaper than any other of the *powerful* lights. Why, then, is it not more generally made use of in photographing nocturnal and underground scenes? I am well aware of several pictures of the Mammoth Cave of Kentucky having been obtained by the magnesium light, and one therefore naturally inquires why our caves and mines at home cannot be photographed by similar means. The reply, I think, will not be very difficult to give. It is an unfortunate circumstance in connection with the burning of magnesium that an exceedingly dense smoke is emitted, which smoke, composed of magnesia, renders the surrounding atmosphere so foggy as to prevent any photography from being practised after the first attempt has been made. Now, in a cave of large dimensions this difficulty is not felt to the same extent as when one is crouching in a circumscribed position. In the former case the smoke has some chance of getting away and becoming dissipated through space; but in the latter the light has scarcely been allowed to burn for three or four seconds ere one is enveloped in a dense cloud. It is well understood that through the agency of large and flexible tubing the smoke may be conveyed away some distance; but still this does not meet the difficulty in an adequate manner. What is required is a method by which no smoke whatever will be emitted. Various proposals have been made for effecting this end, among these being the passage of the smoke through channels moist with acid which will dissolve the magnesia as it comes in contact with the sides and roof of this channel, as it inevitably must. A friend of mine set himself three or four years ago to grapple with this difficulty, and I understand that his endeavours have been crowned with a larger measure of success than has yet fallen to the lot of others. The means by which he obtained this success have not yet been divulged, which is a pity, as it would facilitate the application of the magnesium light to the purposes of photography.

* Concluded from page 424.

In common with many others I have been much pleased at seeing in a recent number of this Journal a contribution from our old and at one time well-known friend, Mr. W. J. Stillman. Photography suffered a serious loss when he was induced to lay aside his amateur camera and throw himself into political and journalistic life as special war correspondent of a powerful London daily newspaper. The Eastern question being now so nearly settled, it is to be hoped that this energetic experimentalist and able writer will see it to be conducive to his comfort to resume his investigations in photography.

Like too many of the more recent meetings of the British Association, the Dublin one has passed without making its mark on photography. I suppose it is in the nature of things that photography cannot be represented both at meetings of societies specially devoted to this art-science and also at the British Association. Let us be thankful that the photographic "thoughts that burn" find a channel of expression somehow, even if that should not be at the annual congresses of scientific men.

Everyone who has read the various writings or speeches of Mr. H. J. Newton, the President of the Photographic Section of the American Institute, must be cognisant of the great amount of time and trouble he has bestowed upon the subject of the improvement of the alkaline developer for dry plates. This gentleman having turned his attention to the ferrous oxalate developer recently introduced to the public through the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY, and having made certain modifications in the manner of its preparation, is now enabled, after a brief trial, to give as the result of his experience an important expression of opinion, namely, that he feels justified in saying that it promises to be the developer of the future for emulsion plates. This, coming from Mr. Newton, is not a little important.

NEW SILVER SALTS IN EMULSIONS.

SINCE last week I have been engaged in some experiments intended as preliminary to a thorough inquiry into the new method of correcting emulsions described in an editorial article two or three weeks ago. My object has been, so far, to try the comparative effects of some of the substances recommended in that article, and to weed out those which seem to produce an inferior effect to the rest, thus economising both time and trouble. It is true that, working as I have done, the results obtained may differ from those given by the same substances when added to the emulsion; but I think my method should give at least an approximate idea of the probable action of the agent employed.

The course I have followed has been to prepare an emulsion containing excess of silver restrained by nitric acid. Citric acid (my favourite) I have in this instance eschewed, for the obvious reason that, as it forms one of the list of substances to be tested, its employment in connection with any of the others would only lead to uncertainty as to the real active agent. Two emulsions were prepared—one containing an excess of one grain, and the other four grains of silver nitrate in each ounce. After coating the plates they were allowed to set, and were then plunged into a solution of the substance to be tested, being allowed to remain there until the "greasy" lines had quite disappeared, after which they were well washed under the tap and dried without preservative.

Tested in this manner the results were briefly as follow, the comparison being made with a plate prepared from the same emulsion and simply washed previous to drying:—Citric acid of the strength of ten grains to the ounce produced no difference whatever in the sensitiveness or density of the plate, the only feature distinguishing the image from that obtained on the simply washed plate being a slightly colder tone. Phosphate of soda fifteen grains to the ounce produced a denser-looking film before exposure, and gave a decidedly denser image under development, the difference being especially noticeable with the emulsion containing the larger excess of silver. But, in addition to the increase of density, the latter emulsion also gave a distinct veil over the whole surface of the plate, and, upon a very minute examination of the film before fixing, the shadows and portions which should have been perfectly clean were found to be covered with a very fine "mottling," as if the surface had been delicately stippled. This, however, was unnoticeable after fixation.

A solution containing fifteen grains to the ounce of neutral oxalate of potash gave still greater density than the last-named salt; in fact, it was a matter of the greatest ease to obtain absolute opacity with alkali alone. The same veil was produced with the larger excess of silver, but in this case the mottled appearance was absent. Dilute acetic acid produced no effect, but acetate of soda (fifteen grains to the ounce) gave a result intermediate between the phosphate and oxalate. Tungstate of soda proved similar in effect to the others, but the difference was less marked than in any of the preceding cases. In no instance did there seem to be any alteration in the degree of rapidity.

As the result obtained with both citric and acetic acids was entirely negative, while acetate of soda proved effective, I saturated the citric acid solution previously employed with carbonate of soda, forming a solution of citrate of soda. Plates treated with this gave an accession of density nearly equal to the oxalate, but differing greatly in colour. A considerable portion of the free silver contained in the film was found to wash out and suffer decomposition in the solution instead of in the film, the two acid solutions alone remaining clear; still a sufficient quantity remained behind to show that the various silver compounds formed were capable of producing an important effect upon the resulting image.

Some of the results recorded—notably those with the uncombined acids—appeared, at first sight, to differ in an unaccountable manner from what I had anticipated; and I should like to point out where the discrepancy arises, and in what respect the addition of the substances to the emulsion itself would be likely to act differently. Very few of my readers require to be told that neither citric or acetic acid added to aqueous solution of nitrate of silver (of ordinary strength at least) will produce a precipitate. This is owing, not to the solubility of the citrate and acetate of silver in *water*, but to the action of the nitric acid liberated by the decomposition of the silver nitrate. If a small quantity of the acid silver solution used for intensification be cautiously neutralised with a caustic alkali it will be found to deposit, first of all, a white precipitate of citrate or acetate of silver; but when the point of neutrality is passed the precipitate will be dark brown oxide of silver.

In order to obtain a precipitate of citrate or acetate of silver it is necessary to employ an alkaline citrate or acetate, and then the nitric acid goes from the silver to the alkaline base, allowing the insoluble silver compound to fall. This explains the reason of the negative results obtained with citric and acetic acids as recorded above, and would possibly also account for the continued washing out of small traces of soluble silver salt from the precipitated emulsion, as described in your editorial article.

I have said that no precipitate occurs between citric acid and *aqueous* silver solution; but if alcohol (or collodion) be substituted for the water as solvent the case is quite altered. If nitrate of silver be added in the usual manner to collodion containing a few grains of citric acid in place of bromide a perfect emulsion of finely-divided citrate of silver is formed; with alcohol alone as the solvent the citrate is, of course, precipitated. I have not tried acetic acid in the same manner with collodion; but in alcohol it causes no precipitate (properly speaking), but merely a peculiar turbidity, arising, apparently, from the presence of innumerable extremely minute crystals. In the case of sulphuric acid, which behaves in a similar manner to citric, the non-production of a precipitate in aqueous solutions has been attributed to the solubility of sulphate of silver in water; but its very feeble degree of solubility certainly does not warrant such an assumption. I am inclined to think that the presence of free nitric acid is essential to the production of such a result, and this view is borne out in the case of citrate of silver, which is (I believe) perfectly insoluble in pure water.

I mention these peculiarities in order to point out that the form in which the correcting agents are applied either to the emulsion or to a plate containing free silver is a matter of some importance, but more especially in the latter cases. In using an uncombined acid it would, I think, be advisable, after allowing a sufficient time for the completion of its reaction, to follow it by partial neutralisation with alkali. Perfect neutrality (or alkalinity) would, no doubt, produce fog; but I think at least a portion of the free acid might be advantageously got rid of. In conclusion: I may say that my object in publishing these crude experiments and the accompanying remarks is to point out what might possibly prove pitfalls in the way of some who may attempt to follow the editorial lead. W. B. Bolton.

PHYSICS IN PHOTOGRAPHY.

In taking a retrospective glance at the remarkable phenomena exhibited in photography an endeavour will be made to explain them as far as possible by the light that may be thrown upon them by modern research, and, at the same time, to suggest extensions which probably may be given to this branch of science by further investigations. We may, perhaps, be open to rebuke from some for venturing to call photography a science; but, surely as long as there are problems in it to be solved which require direct scientific solution, and which perhaps indirectly lead to the research in other directions, so long at least must it be something beyond a mere industrial pursuit. It is not the fashion to deny to electricity the honourable distinction of being a science, although it has become an industry in its application to telegraphy. Why, therefore, it should be considered correct to consider the study of the chemical action of light upon compounds as something to be remitted to the intellect of those who are merely interested in it commercially it is difficult to understand. It would surely be much better that men of science, who employ photography in their laboratories and observatories, should endeavour to understand the science of attack with the weapon they are using, instead of regarding it as a simple mechanical agency which is only worthy of the attention of, perhaps, a half-educated assistant. If our men of science, who employ both, were to be as ignorant of the principles of electricity as they too often are of photography, research would be very much restricted in its results; and it may, it is believed, be said with truth that a familiarity with even the first principles of photography would very much extend it. We may remark, by the way, that to instil a love of science into youth an education in photography would seem to be of great value, as experiments can be made which have a real meaning to the experimenter, and which, by allowing an almost endless variation, offer an unlimited field for the exercise of the reasoning faculties. A study of photography, in short, must encourage the study of chemical and physical sciences, if a distinction may be made between the two.

Photography must undoubtedly be divided into two distinct branches—the direct production of the visible image by light itself, and the development of the invisible image by chemical means. The recognition of the former we owe to Wedgwood, and of the latter to Daguerre. The discovery of the former is much less remarkable than of the latter, since, without any particular research, a discolouration of a compound by light must have been noticed; whereas the development of an invisible image would have been a matter of theoretical reasoning, unless accident showed its feasibility. We know that the development of Daguerrean images was discovered accidentally by Daguerre, and we also know that the development of the image on paper was discovered accidentally by Reade. Without two such wonderful strokes of good fortune the growth of photography might have been retarded for years. The years which succeeded the discovery of the developable image were productive of research into many of the phenomena exhibited by the action of light on sensitive compounds, and, owing to the great intellects who gave their attention to it, many important problems in photography were solved. Succeeding these years, however, were others in which little was done in the absolute science of the subject, though great progress was made in perfecting the processes which had been brought forward. Within the last few years a fresh start in researches in all directions seems to have been made, and much that is valuable in elucidating the correct theories on which photography is based has been demonstrated, and it is to this to which attention will be drawn.

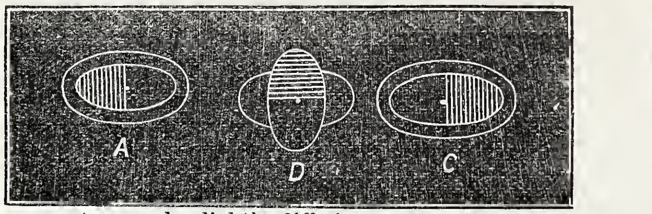
With the risk of being tedious, ground which has been well trodden must once again be briefly gone over, in order to estimate the progress which more recently has been made. Scheele, the Swedish chemist, as is well known, found that the blackening of silver chloride (which was the basis of Talbot's pictures) gave up chlorine on exposure to light, thus proving, as it were, that the blackening was due to the formation of a new chemical compound. As far as can be traced not much more was known regarding this compound; but it was a generally-received notion that it was a sub-chloride of silver, and up to the present time we find that such is the accepted opinion. In the second edition of Hunt's *Researches on Light*, published in 1854, p. 79, a remarkable experiment is noted. He says:—"The exposure (of silver chloride) in the water was, in another case, continued for several days, but no greater degree of darkening occurred; but a curious fact was noticed. It was found that during the night nearly all the chlorine which had been liberated during the day was recombined, and that the darkened powder became lighter." . . . He then, after recounting other experiments, says (p. 123):—"From other experiments I am inclined to believe that the first action of the solar ray is to liberate one-half of the combined chlorine, which is very readily, moisture being present, replaced by oxygen. By the continued action of the exciting cause the oxide is decomposed, and metallic silver, in a fine state of division, is formed over the surface" (of the paper).

P. 125:—"The absorption of oxygen, or rather its combination, with the decomposing chloride is proved by another very easy experiment. Some pure chloride of silver was arranged in a bent tube, closed at one end, and the other end immersed in a bottle of distilled water In this state the chloride was exposed for many days to the action of sunshine, during which time it was frequently shaken for the purpose of exposing the whole of the powder and its influence. As the chloride darkened the water rose in the tube, and it gave a precipitate of chloride of silver on the addition of the nitrate, thus appearing to prove the substitution of oxygen for chlorine under the agency of solar radiation. It was quite evident that some absorption of atmospheric air had taken place. This explanation will also serve for the iodide, bromide, and some other salts of this metal (silver)."

This last experiment has lain fallow for years, and it is only recently that it has had any meaning beyond that indicated in the quoted paragraph. It must be borne in mind, however, that the visible change in the chloride is here under consideration, and that the invisible effect of light was not mentioned.

With regard to the developable and invisible image: till within the last few years it was a debatable point as to whether the action of light on a sensitive compound was really a chemical change or simply a physical action. One school held that the sensitive compound was not altered in composition at all, but that in some mysterious manner the atoms of the molecules composing it were shifted, and possessed a new property which was denied to it in the original form. Diagrams were introduced to render this subtle change clear to the student, one of which is reproduced (*fig.* 1).

FIG. 1.



In A we see two ovals slightly differing in size, each of which was intended to indicate one of the atoms composing a molecule of the sensitive salt. When the ovals coincided the molecule was supposed to be in the ordinary state, but after light acted upon it for a certain time the ovals occupied the position shown in B, and after a further action of light they occupied the position shown at C, in which it again became incapable of proper development, and gave rise to what was known as *solarisation*, the part of the "*latent image*" formed by these solarised molecules refusing to *develope*. By solarisation was meant the phenomenon which occurred (more especially if silver films containing iodide were used), when any portion of the plate received a lengthened exposure to any very bright part of the lenticular image, such as that of the sky. In solarisation we have a term which is as unmeaning as is "polarisation" in some of its applications, but since it has passed into the technical language of photography we are bound to employ it. By the term "latent image" was meant the invisible (and usually) developable image impressed upon a sensitive film; and it will be used, where convenient, with the reservation, once for all, that its applicability is not admitted any more than is the term "developer," as applied to a solution which may cause the deposition of metallic silver from a solution of silver nitrate, since such a solution is effective whether applied to an exposed sensitive film or not. The advance of photography has literally been impeded from the neglect of using accurate language. As regards this peculiar condition which the molecule was supposed to have attained after its impact with light, there seems to be no ground for its adoption. The idea seemingly arose from a supposed necessity which existed for a difference in condition between the visible and the merely developable image. By a strictly logical inference there need be no difference between the two, beyond this—that there should be a difference in the number of molecules absolutely altered, and in no other respect. Perhaps the most telling experiment giving *direct* evidence of the similarity of the two images was that made by Poitevin, in which he proved the dissociation of iodine from silver iodide, by placing metallic silver in contact with the film. After exposure to light, on separating the two, he found that the latter had absorbed iodine, as proved by treating it with mercury vapour. The *circumstantial* evidence of the truth of the chemical theory of the invisible image, however, is so strong, that on that alone we are bound to accept it; at the same time we are not prepared to say that there are no other physical forces which must play a part in its development—in fact, it must be so. We may say, then, that at its *first formation* the developable photographic image is formed by the reduction of the sensitive compound to one of a less complex nature. Thus, silver chloride (argentic chloride) is reduced to silver sub-chloride (argentous chloride) with the liberation of chlorine; and silver bromide to silver sub-bromide, with the liberation of bromine, and so on.

We must now allude to the development of the photographic image. We may divide the methods of development of the image on silver compounds into three:—(1) The condensation of mercury; (2) the deposit of metallic silver from a soluble salt of silver by means of a reducing agent such as ferrous sulphate; and (3) the reduction of the sensitive salt of silver itself to form the image.

The first method is the earliest, dating from the discovery of the daguerreotype process, and till within very recent times the reason of its efficacy has been a subject of controversy. Quincké has lately thrown a light upon it in one of his memoirs, and his explanation seems to account for it in a most perfect and philosophical manner.

In the daguerreotype process, it will be remembered, a silvered plate is subjected to the vapour of iodine (or of iodine and bromine), and thus receives a fine layer of a compound which is sensitive to light. When a plate so prepared is exposed to a lenticular image in the camera the light causes the iodide (or bromo-iodide) of silver to throw off iodine (or this together with bromine), which is immediately seized by the silver beneath, and thus forms a deeper layer of the sensitive salt. The depth, almost immeasurable though it be, depends on the intensity of, and length of exposure to, the light. (That this is the case has been proved by the fact that, if the sensitive layer be removed by a suitable solvent, the surface beneath is shown by reflected light to be etched to a greater or less degree.) The invisible image thus formed is exposed to mercury vapour, and the dew condenses on it proportionately to the depth of the layer. Quincké, in his memoir *On the Edge Angle and Spread of Liquids on Solid Bodies*,* shows that the edge angle of a drop of liquid on a solid body varies from zero to a constant quantity, according to the thickness of any fine layer of impurity which may be on the latter. When this layer attains a certain value then the edge angle of the drop will remain constant. The thickness, or rather the thinness, of the layer may be appreciated when it is stated that it bears a relation to what is called "the radius of the sphere of sensible action of molecular forces," and is usually greater than ·00005 millimetre. In this case the sensitive plate is the solid body, and the invisible image forms different thicknesses of impurity. By this difference in the edge angles of the mercury dew, condensed on different portions of the latent image, the light is reflected in different ways, which gives rise to the visible image.

This explanation entirely does away with the necessity, which previously seemed to exist, of the silver iodide (or bromo-iodide) being reduced to the metallic state, in order to cause condensation, or—perhaps it might be said—to cause the formation of an amalgam of mercury and silver.

The next method of development speaks for itself; the metallic silver is deposited in fine granules and is attracted by the salt which has been altered by the influence of light. Perhaps further investigation will show that development is dependent on what is known as the Brownian movement, or the rapid movement of small suspended particles in a liquid. If this movement be dependent on the electrical condition of the neighbouring body, as has lately been supposed; and if, as Dewar has shown, the condition of an exposed sensitive salt is electrical, then the deposition of the metallic particles of silver on the image is accounted for in a satisfactory manner.

The last mode of development is principally employed with silver bromide, and is known as the alkaline method. When a film of collodion or gelatine holds a sensitive salt on a plate, the portions exposed to light are reduced to the metallic state by the application of an oxygen absorbent, such as alkaline pyrogallic acid. Since the image is invisible it must be remembered that but a few molecules of the sensitive salt are reduced by the action of light to the less complex and developable form. We therefore must look for some further action between the developer and the rest of the unaltered compound. It has lately been proved that silver bromide or silver chloride cannot exist in *close* contact with metallic silver. It invariably forms the developable salt. Thus, if we take a glass plate, silvered by any of the well-known processes, and expose it to the fumes of bromine or to hypobromous anhydride, it will be found that it is impossible to secure a film of argentic bromide until the last trace of silver has been attacked, after which the true colour of argentous bromide gradually gives way to the well-known colour of argentic bromide. We may try the experiment with bromine water and the same holds good. The action of chlorine on silver is the same as of bromine; but the action of iodine seems to be different, the fully-saturated compound, argentic iodide, being formed at first. In other words, this compound is more stable than argentous iodide.

Now the alkaline developer, when mixed with a soluble bromide of an alkali, has the property of much more readily attacking the argentous than the argentic bromide, presumably because the soluble bromide used in development combines with the former, giving rise to an apparently difficultly-reducible compound, whilst it refuses to combine with the argentous salt. It is thus easy to see, if this property of the developing solution be connected with what was stated in the preceding paragraphs, how development takes place. The developer is applied to the exposed film, and the minute quantity of argentous compound is reduced to the metallic state, and at once this particle of silver which is in close contact with the unaltered compound combines with it and forms new argentous bromide. This is ready for attack by the developer, and thus the action spreads till the whole thickness of the sensitive salt is reduced to the metallic state where the greatest exposure has taken place. An interesting result† of this action is afforded by the fact that, if a film of unexposed argentic bromide be superposed over one that has been exposed, the image impressed on the latter can be developed in the former so long as close contact is secured. It has been said that this action is due to the solubility of the silver bromide used in the alkaline development. To some extent this is true; but it is evident that this cannot be explanatory of the whole phenomenon, since the same effect is produced by using, with the pyrogallic acid, potash as the alkali in which the silver bromide is absolutely insoluble. We have been thus particular in showing the cause of this alkaline development, as it explains some phenomena to which attention will subsequently be called, and which otherwise would be inexplicable, except by reversing usually-accepted physical laws.

—*Nature.* W. de Wiveleslie Abney, *Capt. R.E.*

(To be continued.)

* *Phil. Magazine*, May and June, 1878.

† *Phil. Mag.*, January, 1877.

ON PROCESSES OF MAP PRODUCTION BY PHOTOGRAPHY.*

Photolithography and Photozincography.

Zinc plates possess great advantages over lithographic stones on account of their superior lightness, cheapness, facility for storage, and less liability to breakage, and are, therefore, to be preferred in reproducing plans of large size. For fine work stone is considered by some to give better results than zinc, but I believe that, if due care be taken, as good prints may be made from zinc as the best from stone.

In the Southampton process the whole of the unaltered gelatine is removed from the paper, and the objection has been made that, in consequence of this, the ink on the lines being left on ridges of gelatine is more liable to spread in transferring; that the fine lines are liable to be washed away by the dissolution of the gelatine beneath them, and that the prints are liable to slip during transfer. To remedy these defects various methods have been proposed for retaining the gelatine on the paper.

One of the best of these methods has been perfected by Captain Abney, who has patented it under the name of "papyrotype."†

A tough paper is coated with gelatine and subsequently treated with alum or chrome alum. It then receives a coating of gelatine and bichromate of potash, as in the Southampton process. After exposure to light the print is drawn through *cold* water, and is then "squeegeed" down on to a smooth metal plate and inked in with a soft gelatine roller charged with transfer ink. The ink "takes" only on the parts exposed to light, while the ground of the print remains clear. When the image is fully inked up the print is dried and exposed to light to harden the gelatine thoroughly by the action of the light on the bichromate salt still remaining, and is then ready for transfer to stone or zinc.

Among the advantages claimed for this process the principal are these:—The ink which forms the lines is not left on ridges of gelatine, as in the Southampton method. The fine lines are not liable to be removed. The surface of the transfer will have no tendency to slip during transfer. In practice this method was not found to answer in this country so well as the ordinary one; but a modification of the latter has lately been introduced into the Surveyor-General's office, with the same object as the papyrotype, and seems to answer well.

The paper is prepared as usual with two coats of gelatine and bichromate of potash. It is then put away for a few days, in order to allow the gelatine to become hard and insoluble. When required for use it is coated again with a mixture of gelatine and bichromate of potash of about one-third the usual strength, and is then exposed to light and inked in the usual way. The washing is done with cold water instead of with hot.

A method of photolithography by transfer, which yields excellent results in line, and even reproduces half-tones fairly well, is a modification of Asser's process, invented by Mr. Toovey, of Brussels, who coats paper with a solution of gum arabic mixed with bichromate of potash, and, after exposure to light under the negative in the usual way, places the transfer-print face downwards on the stone with several thicknesses of wet blotting-paper over it, and leaves it under pressure for some hours in a powerful press.

The gum on the parts not exposed to light being soluble is forced into the stone and prepares it, while the lines, being hardened and rendered insoluble, leave the stone quite free from gum and ready to take printing ink from a roller when passed over them, thus producing an image which may be printed from as soon as the soluble bichromate salt has been washed out, because the bichromated gum is a most powerful preparation for the stone, and, indeed, is difficult to remove without grinding the stone down to some depth.

This process requires care in adjusting the amount of moisture to be applied to soften the gum so that it may not be squeezed under the lines and block them up, and it has not, I believe, come into general use.

There are two disadvantages which militate against the employment of the transfer processes of photolithography for the finer and better class of maps. The first is the difficulty of obtaining reproductions perfectly true to scale, owing to the unequal expansion of the transfer paper in the various washings and squeezings it has to undergo. Although this unequal expansion and contraction is very slight, and for most practical purposes may be disregarded, it has greatly hindered the more universal adoption of this valuable method for the reproduction of the official maps in England and foreign countries.

Mr. Rodriguez, of Lisbon, has, however, lately introduced an improvement into the transfer process with the object of doing away with the possibility of stretching in the course of any of the operations.‡ Instead of using paper as the support of the coating of gelatine on which the photographic image is impressed he uses a sheet of tinfoil about the thickness of thin paper. This is first smoothed on a very finely-grained lithographic stone, and then laid down quite flat on a sheet of zinc. After being cleaned with alkali and well washed the tinfoil is brushed over with a solution of gelatine and bichromate, dried rapidly, and is then ready to be exposed under a negative in the usual manner. To ink the print the sheet of tin is first plunged into water, and then carefully laid down wet on a lithographic stone, so as to avoid folds, the gelatine side being uppermost. The film is then inked in with a roller. After the first inking in the print is left for about a couple of hours, and is then inked in again, and afterwards washed with a sponge and water. It may then be lifted off the stone and dried. The operations of transfer are the same as usual.

The second disadvantage of the transfer methods is the almost unavoidable spreading of the lines under the operation of transferring, which makes a photolithographed map look heavy and unsightly compared with a lithographed one. This defect may, however, be diminished very much by skilful manipulation and taking care to have as thin a coating as possible of gelatine on the paper, and to use a good, hard, transfer ink in small quantity. With these precautions and with a suitable original results may be obtained from photolithographic transfers which will well compare with ordinary lithography, or even engraving, in sharpness and delicacy.

These special defects of the transfer methods may be in great part obviated by impressing the photographic image direct on the stone, as originally proposed by Poitevin; but this plan has again other disadvantages of its own which render it less suitable for map work than the transfer process. It has, however, been used extensively and very successfully in the production of the Belgian topographical maps on the scale of 1 : 20,000.

In the process used for the Belgian maps the stone is covered with a very thin coating of a mixture of gelatine and bichromate of potash, rapidly dried, and exposed to light under a reversed negative, which is obtained by reversing the position of a dry tannin plate in the camera, and allowing the light to act through the glass on the underside of the collodion film. A thin coating of printing ink is then applied all over the stone with a roller, and the surface is afterwards washed with warm water in which a little starch has been dissolved. This gradually removes all the soluble parts of the gelatine coating, leaving on the stone a clear image of the map. The stone is then covered with gum, and, after drying and remaining for a short time, is ready for printing, and capable of yielding 1,500 good impressions.*

For line work zinc plates are also used and prepared in much the same way.

This process has undoubtedly some advantages as regards accuracy of scale and the quickness and cheapness of the operations. On the other hand, it has disadvantages as regards the difficulty of securing perfect contact between the stone and the negative; the necessity for a reversed negative; the prints being limited within a single negative, and the inconveniences of working with heavy stones.

Besides the foregoing many methods of photolithography have been proposed, but, as for the most part they are only modifications of the processes I have described, which are all good and may be considered typical, it will be unnecessary for me to go further into details regarding them.

J. Waterhouse, *Capt.*

(To be continued.)

* Continued from page 428.

† *Instruction in Photography*, p. 155.

‡ The British Journal of Photography, vol. xxv., p. 232.

* Maës and Hannot's *Traité de Topographie, et de Reproduction des Cartes au moyen de la Photographie*; also Hannot's *La Photographie dans les Armées.*

FOREIGN NOTES AND NEWS.

The Berlin Photographers' Assistants' Society.—A Monument to M. Nicephore Niepce.—Photography in Schleswig-Holstein.—A New Yellow Photographic Paper.—Schaarwächter's Camera.—Härtwig's Chloride of Silver Collodion.

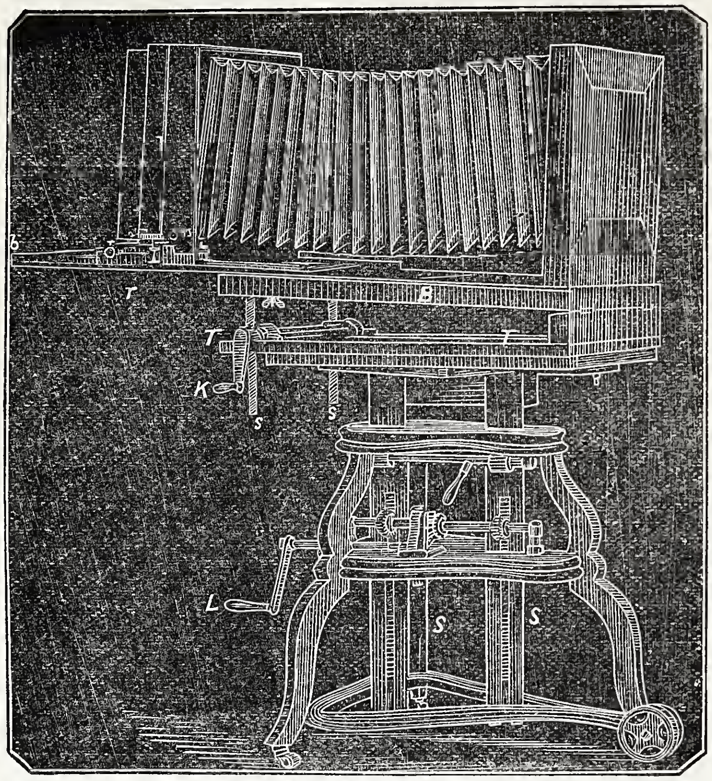
The annual meeting of the Berlin Photographers' Assistants' Society was held some time ago, and the state of the funds was reported satisfactory. The principal object of the Society is to obtain situations for the members, and in this it is singularly successful. A year or so ago a short account of the Society and its rules was given in these columns.

The *Monatsblätter* reports that a project is on foot, headed by M. A. Galopin, the *maire* of Chalons-sur-Saone, to erect a monument in that town to M. Joseph Nicephore Niepce, M. Daguerre's rival, as the inventor of photography.

Dr. Vogel was lately invited to visit, in the capacity of juror, the provincial exhibition of Schleswig-Holstein, at Flensburg. There he was agreeably surprised to find photographs taking a leading place amongst the exhibits. More than half the photographers who exhibited showed carbon prints. Only two persons exhibited landscapes, but of portraits there were a great variety in silver and carbon, large and small, the former both direct and enlargements. Dr. Vogel was particularly struck with the excellent tone of the cardboard mounts, which harmonised admirably with that of the photographs. Altogether, considering the size of the province, there was a most gratifying display.

According to the *Papier Zeitung*, a very cheap yellow photographic paper is shortly to be brought into the market. It is prepared by diluting pure egg albumen with a saturated solution of bichromate of potassium in soft water. Upon this mixture the paper is floated and dried quickly in an oven, well protected from actinic light. Of course it must be pressed and stored in the dark. In the same way, omitting the albumen, paper tinder is prepared from unsized paper. This preparation takes fire very easily, and is the *fern seed* or *grass paper of tobacconists.*

The accompanying illustration, cut from the *Photographische Mittheilungen,* represents a new camera constructed by Herr Garcis for Herr Schaarwächter, of Berlin. The camera rests upon a table T T, from



which it is raised up by means of hinges at the back and the screws S S in front. By the aid of the latter the camera can either be made perfectly level or sloped down towards the front, or tilted up from the back. The screws are moved by means of the crank K, and the table T can be drawn out so as to follow the movement of the camera without it being necessary to lift the whole stand. The arrangement of the tripod can be seen by reference to the diagram. The footboard of the camera itself, B, is furnished with a continuation, *b*, which runs in grooves and allows of the camera being drawn out to almost twice the length of B. This continuation carries the focussing-glass, which can be moved on a horizontal axis by means of the screw, *r*, and on a perpendicular axis by means of another screw, which is not shown in the diagram. The focussing arrangements are those described in the third German edition of Dr. Vogel's handbook. The advantages possessed by this camera-stand are that all the cranks can be easily reached by the operator from his place at the back of the camera, and that the camera can be drawn out to an extraordinary length with great ease.

The *Photographische Correspondenz* gives the formula for Härtwig's collodion, which is rather popular in Germany. Prepare the following solutions :—

Nitrate of silver	8 grammes in	8 c.c. distilled water.
Chloride of calcium	1 gramme	in 20 c.c. alcohol.
Citric acid	1 dramme	in 20 c.c. ,,

Then heat in a wash bottle 180 c.c. alcohol, and while continually shaking add the silver solution and then eight grammes of collodion cotton. The solution is best kept warm in the sand bath. 150 c.c. ether should now be added, a little at a time, and stopping to shake up; then, light being excluded, add the twenty c.c. of chloride of calcium solution, and, lastly, the twenty c.c. of citric acid solution. The collodion, after standing a few hours, is now ready for use with gelatine, chalk paper, or direct upon glass. The prints are toned after being washed in a fixing bath containing gold.

Our Editorial Table.

Scientific Memoirs. By John William Draper, M.D., LL.D., &c.
London: Sampson Low, Marston, Searle, and Rivington.

Physicists will accord a hearty welcome to this volume. It consists of a collection of memoirs and essays on scientific subjects, published by the author at various intervals during the past forty years in numerous journals, pamphlets, and the transactions of learned societies. Many of those of less interest have been abridged or condensed. Those only are included in this volume which are connected with the effects of radiation or of radiant energy. Many of our readers are doubtless aware that for these investigations the talented author, Dr. Draper, has been awarded the Rumford medal for discoveries in light and heat by the American Academy of Science.

There are thirty of these memoirs selected for publication, and several of them have relation to topics of interest to scientific photographers, such as the Production of Light by Heat and Chemical Action—the Invisible Fixed Lines in the Sun's Spectrum Detected by Photogaaphy—Studies in the Diffraction Spectrum—The Daguerreotype Process—On Lunar Photography—On the Taking of Portraits from Life by Means of Photography—On the Chemical Condition of a Daguerreotype Surface—On Microscopic Photography, &c.

To one of the memoirs, *On the Taking of Portraits from Life by Photography* (from the *Philosophical Magazine,* September, 1840), there is prefixed a note to the effect that this memoir contains the first published description of the process for taking daguerreotype portraits. That it was possible by photographic processes, such as the daguerreotype, to obtain likenesses from life was first announced by Dr. Draper in a note to the editors of the *Philosophical Magazine,* dated March 31, 1840, as may be seen in that Journal for June of that year. This distinguished *savant,* it is now well known, was the first who ever obtained a portrait by means of photography. Alluding to this Sir David Brewster, in an important article on photography in the *Edinburgh Review* for January, 1843, says :—" Dr. Draper was the first, we believe, who, under the brilliant summer sun of New York, took portraits by the daguerreotype. This branch of photography seems not to have been regarded as a possible application of Daguerre's invention, and no notice is taken of it in the reports made to the legislative bodies of France. Daguerre had not at that time taken any portraits." In the chapter under notice we have a detailed account of the conditions at that period found requisite in order to obtain a portrait by means of photography. To enable our readers to form an idea of the difficulties inherent to the obtaining of portraits in those early days we give the following extract from Dr. Draper's memoir on that subject :—

" When the sun, the sitter, and the camera are situated in the same vertical plane, if a double convex, non-achromatic lens—four inches in diameter and fourteen in focus—be employed, perfect miniatures can be obtained in the open air in a period, varying with the character of the light, from twenty to ninety seconds. The dress is admirably given, even if it should be black; the slight differences of illumination are sufficient to characterise it, as well as to show each button, button-hole, and every fold. Partly owing to the intensity of such light, which cannot be endured without a distortion of the features, but chiefly owing to the circumstance that the rays descend at too great an angle, such pictures have the disadvantage of not exhibiting the eyes with distinctness, the shadow from the eyebrows and forehead encroaching on them.

" To procure fine proofs the best position is to have the line joining the head of the sitter and the camera so arranged as to make an angle with the incident rays of less than ten degrees, so that all the space beneath the eyebrows shall be illuminated, and a slight shadow cast from the nose. This involves, obviously, the use of reflecting mirrors to direct the ray. A single mirror would answer, and would economise time; but in practice it is often convenient to employ two—one placed with a suitable mechanism to direct the rays in vertical lines, and the second above it to direct them in an invariable course towards the sitter.

" On a bright day, and with a sensitive plate, portraits can be obtained in the course of five or seven minutes in the diffused daylight. The advantages, however, which might be supposed to accrue from the features being more composed, and of a more natural aspect, are more than counterbalanced by the difficulty of retaining them so long in one constant mode of expression. But in the reflected sunshine the eye cannot support the effulgence of the rays. It is, therefore, absolutely necessary to pass them through some blue medium, which shall abstract from them their heat and take away their offensive brilliancy. I have used for this purpose blue glass, and also ammonia-sulphate of copper, contained in a large trough of plate glass, the interstice being about an inch thick, and the fluid diluted to such a point as to permit the eye to bear the light, and yet to intercept no more than was necessary."

The *Scientific Memoirs* will be much prized by men of science in this country, who have ever known and valued the rare endowments of Dr. Draper. The work contains numerous illustrations, and is embellished with an admirably-engraved portrait of the able and distinguished author.

La Photographie en Amerique : Traité Complet de Photographie Pratique. Par A. Liébert.
Paris: 6, Rue de Londres.

From the title it will be seen that M. Liebert's work is written in his native (French) language. It contains numerous illustrations, twelve of these being devoted to showing the various effects that may be obtained by certain arrangements of the blinds in the studio. There are also illustrations showing the value imparted to a portrait by the judicious retouching of the negative, together with two examples of "chromotypie"—a branch of printing in which M. Liebert is known to feel much interest.

Every department of practical photography is here treated. In addition to the wet and dry collodion processes, and to the production of negatives and prints, several chapters are devoted to carbon printing, photography in printers' ink, Woodburytype, photo-engraving, and and photo-enamelling. We observe that, in addition to the various processes of photo-engraving described in the body of the work, the new process of M. Michaud has been received just in time to be inserted as an appendix before going to press. By this process has been produced some most excellent work, for examples of which we are indebted to our Paris correspondent, Mr. W. Harrison, and to which we shall devote an article as soon as the English specification of M. Michaud's patent is published.

An English translation of M. Liebert's excellent treatise would be much appreciated by the numerous English-speaking *confrères* of the author both in this country and in America.

Meetings of Societies.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

This Society met for the last time this season on Friday, the 5th July,—Dr. Vogel occupying the chair.

The Chairman communicated to the meeting the news of Dr. Weissenborn's death, and the members rose to their feet to testify their respect for the memory of the deceased. He (the Chairman) then said that Mr. Seavey had recently visited Berlin and had shown him a portrait of his daughter taken in Paris by M. Klary by the instantaneous process of M. Boissonas. Mr. Seavey assured him that the exposure had been *one* second, and that a Dallmeyer 3 B lens had been used. The picture was said to be sufficiently exposed, but was somewhat raw and inartistic, and failed as an example of good lighting according to the rules laid down in M. Klary's own pamphlet. In fact, it gave one the impression of having been taken in a perfectly-open glass house where no screen or curtains shaded the light.

Herr Schaarwächter was sure that with specially-favourable light he would himself be able to take such a picture in one second.

Herr Quidde thought that, owing to its south exposure, Paris enjoyed better light than Berlin, and, of course, a perfectly-uncurtained studio would allow the exposure being shortened, though, as the specimen before them showed, it did not add to the beauty of the resulting picture; but, on the whole, he was inclined to attribute the rapidity of M. Klary's work to his chemicals.

The Chairman said that one might easily succeed in getting pictures with a very short exposure if one were to work with a fresh iodide of ammonium collodion, a fresh and as slightly as possible acid silver bath, and a moderately strong developer. In a few days, however, the collodion would lose its sensitiveness, and the silver bath would deteriorate; in short, it would be impossible to count upon getting equally good results for any length of time from the same preparations. Whether M. Klary's preparations remained sensitive or not he could not say, but he had heard from America that his collodion, silver bath, and developer had been in the market there for months, and that at first one could work very quickly with them, but that they soon became less sensitive.

The discussion then gradually came round to the subject of collodions in general, after which a series of cabinet pictures, of anthropological and animal studies in India, were handed round. They were the work of Herr Schirmer—an operator in the employment of Messrs. Bourne and Shepherd, Calcutta.

A letter was read in which Dr. Richard maintained that it was a mistake to reject sulphide of potassium as an intensifier on account of its injuring the operator, as with proper attention paid to ventilation he was sure it would do no harm to persons using it.

The Chairman remarked that sulphide of potassium acted far more powerfully than usual when the plate was previously laid in a solution of iodine. Of course that intensifier could not be used for portraits, as it made them much too hard. With regard to the harmlessness of sulphide of potassium, he could not agree with Dr. Richard, as the fumes of sulphuretted hydrogen thrown off were not only injurious to the lungs of the operator but were also deleterious to the other chemicals in the room. Besides, for the purpose required, Eder and Tóth's lead intensifier was much better.

Some remarks were then made upon Captain Abney's recent experiments on the action of dyes upon bromide of silver, which had led him to agree with Dr. Vogel's theory on the subject, from which he previously differed.

Herr Quidde thought the explanation of the result of Captain Abney's experiments was to be found in the after-action of the rays of light, many bodies which were luminous when light fell on them being phosphorescent in the dark, the question being whether such phosphorescent light could not produce some photographic light. If not, then there must be many other substances which had the power of retaining light and giving it out afterwards.

The Chairman hoped to be able soon to furnish a list of substances in which the property of after-lighting was observable.

Herr Quidde mentioned another sort of photographic after-action which he had occasionally observed. A print was printed upon salted paper (not arrowroot paper) by simply salting and silvering the paper, and immediately above that a print from a second plate was laid, also printed on salted paper. A weak impression of the first plate would after some time be visible upon the back of the second. He had frequently observed this phenomenon, but only with plain salted paper—never either with arrowroot or albumenised paper.

The Chairman said the phenomenon was not new to him, but he did not think it could be attributed to after-action of the stored-up light. It was known that, in printing, a quantity of a reducing gas, whose composition was as yet unknown, was developed. This reducing gas penetrated through the pores of the salted paper, and was absorbed by the porousness of the bundle of paper pressing on it. Naturally the development of gas would be most powerful where the greatest reduction had taken place, namely, in the shadows; subsequently the pressing substance would give off the gas again, and if a new sheet of paper were laid upon it the gas would penetrate the latter, and thus produce by reduction the secondary image. This phenomenon had not been observed in the case of arrowroot or albumenised paper, because their pores were almost closed. With respect to the difficulty of distinguishing collodion cotton from gun-cotton—an objection which had been urged against allowing the free transport of the former—he (the Chairman) said anyone could distinguish them, as collodion cotton dissolves in a mixture of ether and alcohol, while the other cotton did not.

The subject of collodion and collodion cotton was continued for some time, after which Herr Prümm gave an account of his expenses during his visit to Paris.

The question-box was then examined, and the two questions found in it having been answered, the meeting was adjourned until the 20th of September.

Correspondence.

MR. CHAS. BENNETT'S RAPID GELATINE PROCESS.

To the Editors.

Gentlemen,—I think the Editors' foot-note at the end of the valuable and singularly-precise letter of Mr. Chas. Bennett in last week's issue should have been printed in italic capitals, for this gentleman has indeed displayed great care and much patience in giving directions to all comers; indeed, I never before received so much kindness of this sort from a gentleman whom I had never seen or known, but I hope some day to have the pleasure of a friendly conversation with Mr. Bennett.

I am sure this process is *the* one *par excellence*; for why complain of too much sensitiveness in the photographic film, as many do? Cannot the lens be stopped down to almost anything? and why should not practice enable an operator to work just as certainly in the chemical manipulations of a gelatine emulsion as it does with an ordinary process which may be much slower? If we have the power of rapidity we may use it or not at our discretion; but if we have it not, and *require* it, we then are powerless.

I have written this letter to publicly thank Mr. Bennett for his kind assistance, and hope soon to be able to say I am perfectly successful with this process; for I have not yet mastered all my difficulties, but am fully determined to "practice and persevere, for that which is *easily* gained is *lightly* valued."—I am, yours, &c., J. M. J. Danks.

5, *Jesson-street, Coventry, September* 10, 1878.

Photography at Sea.—When, many years ago, the daguerreotype process was in vogue no limits were assigned to the capabilities of photography. One person gravely asserted the possibility of our being able to see objects as small as a mouse in the moon. It was only necessary to obtain a small and sharp daguerreotype picture of our satellite, enlarge it by the camera, and examine this *enlarged* daguerreotype by means of a powerful microscope, and the thing was done. This was, of course, very absurd, but it must yield the palm to the following, which we find in a provincial contemporary, under the heading given at the commencement of this paragraph:—A discovery is alleged to have been made by Mr. Gresham, a practical mechanician, of New York, of a method by which a ship may be photographed on the high seas, distant from 100 to 5,000 miles—the photograph giving the name, the latitude and longitude, and the destination, taken from chalk marks on her deck. Mr. Gresham, after a long series of experiments, has found that he can produce an artificial mirage, the principle of which, he says, is the same as that which reflects in the middle of the desert of Sahara the images of lakes and waters a thousand miles distant. This artificial mirage can, so far as has yet been ascertained, be only produced by petroleum and asphaltum. All that is necessary is the possession on board a vessel of a few pounds of asphaltum, with a censer to burn it in, and a small battery to heat the wires by which it should be surrounded. By a machine invented by Mr. Gresham the artificial mirage is reproduced on tin. The instrument used for photographing the objects seen in the mirage is called by the inventor the "phantasmograph," and is at present in a very crude form. He anticipates, however, that it will before long be brought to perfection, and that the marine insurance companies, when they realise its value, will "only be too glad to insist that all vessels shall carry the necessary apparatus." They will thus be cognisant of the whereabouts of the vessels upon which they have sold risks. At four o'clock precisely, on a clear afternooon, clouds of carboniferous smoke shall, Mr. Gresham proposes, be sent up from ships at sea, the required information as to names and soforth being previously marked in chalk in large letters on their respective decks. Then the photographic instruments are set. One vessel photographs the artificial mirage of another at a distance of perhaps more than 4,000 miles, and on arrival at port the intelligence thus obtained is conveyed to those interested in the matter.

EXCHANGE COLUMN.

A good cabinet lens (trial required) wanted in exchange for apparatus or accessories.—Address, Vincent Hatch, Huddersfield.

I wish to exchange a Ross's $7\frac{1}{4} \times 4\frac{1}{2}$ rapid symmetrical, for No. 5 Ross's slow ditto, in perfect order.—Address, W. H. Belchamber, Cockshot-hill, Reigate.

A dissolving view magic lantern will be given in exchange for a telescope, microscope, or Winter's plate electric machine.—Address, W. J. C., 106, Platt-street, Alexandra Park, Manchester.

Wanted in exchange for a number of coloured lantern slides (Scripture subjects), by Carpenter and Westley, a good *carte* camera and 12×15 bath, with anything useful in photography.—Address, Photo., 77, Peas Hill-road, Nottingham.

ANSWERS TO CORRESPONDENTS.

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

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

F. W. Bannister.—Received.

J. J. A.—Thanks. In our next.

O. T. L. M.—Yes; in this case the firm must be held responsible for the action of the representative.

T. W. T.—The only person who could properly explain the difficulty is at present in the South of Italy, and will not return for several weeks.

C. G.—Mr. Hardwich is not now connected with photography in any way, but has for the past seventeen years been a clergyman of the church of England.

X. Y. Z. (Glasgow).—The copyright in a photograph is vested in the person on whose behalf it was executed. For the rest you must consult a solicitor, as we could not undertake the responsibility of advising you.

Old Subscriber.—Obtain from any optician a large untrimmed spectacle glass of seven inches focus, and cut it in two equal halves by the diamond; now cut them round and trim the edges, and you will have lenses suitable for a stereoscope.

W. Brooks.—Our correspondent, in reply to Mr. Oakes, says that he (Mr. Brooks) does not deal with probabilities, but with facts which he has worked out himself. He hopes to see Mr. Oakes's further communication on stereoscopic transparencies at an early date.

John B. Hart.—The historical matter in Hunt's *Treatise on Photography* is most invaluable. In the optical portion of the work, especially as regards that portion to which you have directed our attention, the explanations given are not in accordance with the best instructions at the present time.

John Frankland (Blackburn).—Our correspondent encloses photographs of a useful kind of camera-stand that may be easily improvised for subjects of diminutive stature. It consists in inserting a stout iron rod into the tubular body of a head-rest, the top of the rod sustaining a small hinged table upon which to place the camera. The idea is good and will prove useful to many.

H. G. I. says:—"Will you or some of your correspondents kindly inform me the name of the composition (and how it is made) of the article used by photographers to put on the *carte de visite* just before burnishing, so as to add an extra gloss to the *carte?*"——Try the effect of a solution of two grains of Castile soap to the ounce of alcohol. This solution is usually employed for the purpose mentioned.

A. Davis.—Let the bath contain forty grains to the ounce, add two grains more bromide than usual to the ounce of collodion, give a prolonged immersion in the bath, and develope with a fifteen-grain solution of iron containing one-eighth of its volume of acetic acid. For groups the latter of the two lenses mentioned will prove the more rapid, unless both are stopped down to the same extent, in which case the former will work rather quicker.

G. B. D.—Unless we made a personal inspection of your studio we could not offer any advice. The only thing that we can at present suggest is that you place a camera close up to, and at the centre of, the background, and with a *very* wide-angle lens take a negative of the opposite end of the studio. Next, remove the camera into the directly opposite position—that is, to the extreme end of the studio opposite to the background—and with the same lens and camera take a similar negative. From these two negatives send us prints.

A Country Parson.—Gas bags are destroyed quite as much by the chlorine present with the oxygen as by the oxygen itself. Its absence may be ensured by dissolving hyposulphite of soda in the washing-bottle, and causing the oxygen, as it issues from the retort, to ascend through the washing-bottle in a series of very minute bubbles. This can easily be effected by inserting the delivery tube in the bottle in such a manner as to cause it to slant, and also by having a series of small holes in its upper side so as to permit the oxygen to issue from the pipe through these minute holes instead of through the lower, and open, *end* of the tube. By attending to these conditions the oxygen, while being washed, will be rendered free from chlorine.

Cambria.—It will prove more satisfactory if you employ a large *Nicol's prism* as a polariser instead of making use for this purpose of the usual bundle of glass plates. The expense of the former is, of course, the chief objection—we may say the *only* objection—that exists in the way of its being generally adopted; but if rumour is correct respecting your financial position this will not prove any objection in the present instance. We are fortunate enough to possess a very fine Nicol's prism of medium dimensions, by which the light from a magic lantern is admirably polarised. If you call we shall be happy to show you how it is utilised. The angle of polarisation of the bundle of glass varies in proportion to the number of plates composing the bundle. Brewster has said that while twelve plates of crown glass give a polarising angle of 74°, the angle is reduced to 60° when twice this number of plates are employed.

C. F. C. (Blandford) says:—"You spoke last week in a very commendatory tone of Rouch's new camera, nor can anything be said too much in its praise; but I think one thing escaped you: the back, from its construction, cannot swing the *right* way; its only swing exaggerates the convergence of perpendiculars. The ingenious makers can surely overcome this only defect by adopting a double hinge, which would make the instrument absolutely perfect."——In reply: our statement that the base-board could be fixed by means of a screw not only at a right angle with the ground glass but at any angle within several degrees of this, so as to provide for the swinging of the back and the consequent securing of non-convergence of the perpendicular lines in architecture, was warranted by the construction of the instrument we examined. On application to Messrs. Rouch and Co. we have been informed that they make some cameras with the tilt *backwards* only, so as to be suitable for landscapes pure and simple, the backward tilt being for the purpose of securing the utmost sharpness in the immediate foreground; in others, the bottom of the body is slightly bevelled or sloped, so as to allow the base-board to be placed at a considerable angle within the perfect square. This enables tilting of both kinds to be practised. It is probable that our correspondent has examined one of the former, or purely landscape, kind; we have been shown both descriptions of instrument.

Outdoor Meeting.—The members of the Manchester Photographic Society and the Liverpool Photographic Association have arranged to hold a friendly meeting at Hawarden, on Saturday, the 21st instant. Permission has been kindly given by the Right Hon. W. E. Gladstone to photograph the old and new castles as well as other points of interest in the park.

The Medal Awards at the French Exhibition.—We learn that the jurors in the photographic section of this exhibition have now made the medal awards. We are not yet in a position to indicate those to whom these medals have been awarded, although we have heard that in the list are to be found the names of Messrs. Payne Jennings, A. L. Henderson, and S. Fry. Full details will appear shortly. In the meantime we understand that each fortunate awardee has been apprised by private letter of his good fortune.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.
For the Week ending September 11, 1878.
These Observations are Taken at 8.30 a.m.

Sep.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
5	29·98	82	73	59	62	65	E	Hazy
6	30·09	99	75	58	58	60	W	Overcast
7	30·14	108	75	55	59	62	W	Hazy
9	30·03	83	70	55	58	60	W	Cloudy
10	30·20	94	69	54	53	58	NW	Cloudy
11	30·28	95	70	52	54	55	WSW	Foggy

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 959. Vol. XXV.—SEPTEMBER 20, 1878.

SLOW *VERSUS* RAPID PLATES.

A few weeks ago we devoted an article to the consideration of the comparative merits of extremely rapid plates and those of a lower degree of sensitiveness for the general purposes of the landscape photographer, expressing an opinion that in cases where the highest degree of sensitiveness is not specially required the slower plates are more to be recommended on the score of reliability. Since then the question has been much discussed, both publicly and in private, and we think we are correct in saying that the concensus of opinion is in favour of the view we adopted. But as in matters of this description a "grain of practice is worth a bushel of theory," we have applied a series of practical tests with a view of placing our opinion upon a more solid basis, and, with the permission of our readers, we will proceed to record the results.

It must be distinctly understood that we speak of general landscape work as usually practised by the *ordinary* amateur. We do not allude to work of any one special class, or to which the entire energies of a skilled operator are solely devoted; under such conditions it is, of course, possible that such a degree of accuracy in the details of manipulation may be attained as to render success, if not absolutely invariable, at least approximately so. We have to deal more particularly with the work of the average amateur who, as opportunity occurs, goes forth to battle with the numerous troubles and uncertainties which surround landscape photography and dry plates especially, and who, without the high degree of technical skill which comes of constant and systematic practice, has to do the best he can with subjects of every class and under a variety of different circumstances. Here it is obviously impossible, or at least undesirable, to aim at the attainment of any special qualities, but rather the object should be to secure the best general results; and we maintain, and shall endeavour to prove, that it is unwise in the extreme to strive in the direction of rapidity to the detriment of other good qualities.

It has been urged in opposition to our view that whatever may be the normal degree of sensitiveness of the plate, whether it be rapid or comparatively slow, it is equally easy to keep within the limits of correct exposure. We think, however, that the fallacy of such an argument must be patent to any thinking mind. *Primâ facie*, it must be more difficult to calculate to infinitesimal portions of time than to larger ones, and the argument of "erring in proportion" must therefore fall to the ground. But even granting the possibility of timing the exposure with equal exactitude in the two cases, we shall endeavour to show that with the same proportionate error in timing a quick and a slow plate the same relative results will not be obtained, the difference being in favour of the latter.

In order to eliminate as far as possible all disturbing elements, we decided to make our experiments with two collodion films of different degrees of sensitiveness rather than pit collodion against gelatine. We do not suppose that the principle differs with the vehicle employed to carry the sensitive material, but we deemed it preferable to secure uniformity. We therefore employed *(a)* an ordinary (or slow) commercial emulsion, and *(b)* a rapid emulsion of our own preparation. We found by experiment that, under certain conditions of lighting, *a* required an exposure four times as long as *b* in order to produce similar results, while by altering the conditions the ratio was increased to five or six to one.

Thus, with the full aperture of a rapid symmetrical, and on an open and pretty-evenly illuminated subject, four seconds and fifteen respectively with the two emulsions gave scarcely distinguishable results; while, with the smallest stop, forty-five seconds and three minutes were the relative exposures necessary for the same subject. In a similar manner, changing the subject from landscape to indoor portraiture, the *a* emulsion required an exposure of ninety seconds to produce a result corresponding with that obtained with *b* in twenty seconds, and, even with that difference in the exposures, the latter gave slightly more softness in the shadows. So far there is a difference in favour of the more rapid emulsion, in proportion as the quality of the illumination is decreased; and, though the discrepancy thus exhibited does not properly come within the scope of our argument, it should be borne in mind by those who are in the habit of using plates of varying degrees of rapidity.

The next experiment consisted in the exposure of a pair of plates for six seconds and twenty-four respectively, employing the full aperture of the lens. This, it will be seen, was fifty per cent. more than the correct exposure in each case. A second pair received exposures twice as long as the normal, viz., eight and thirty seconds. The subject comprised brick buildings, ranging from within a few yards of the camera, the extreme distance being composed of foliage and houses some five hundred yards away—the whole bathed in the warm light of an afternoon sun. The plates were developed separately, and each was treated in such a manner as to produce the best result obtainable under the particular circumstances.

Now, it will be observed that in each pair of plates the same proportionate error of exposure was made, and yet the results were quite out of proportion. With the fifty-per-cent. error the rapid plate gave a flat but not hopeless picture, though decidedly inferior to the properly-exposed plate from the same emulsion. The slow plate, beyond exhibiting a greater softness, was little inferior to the standard. The second pair of plates exposed for twice the proper time showed that the more rapid of the two was hopelessly overdone, the distance being nearly obliterated before the details in the immediate foreground were properly out. Thinking that the development might possibly be in fault, another plate was exposed for the same length of time, and a developer weaker in alkali and containing less bromide was applied; but in this case the distance was more completely lost, while the gain in the foreground was inconsiderable. The slower plate, though flat and wanting in contrast, still showed the minutest details in the distance, presenting a marked contrast to the other.

The development was conducted in each case so as to preserve as far as possible the distance irrespective of the foreground, or at least to secure such harmony as was possible between the two without entirely losing the former. This will explain the apparent under-exposure of the foreground in the doubly-exposed *b* emulsion plate; the distance was lost before the foreground had had time to appear properly. We may here take occasion to point to the incorrectness of the general belief formerly in vogue (and which we have quite recently seen put forward by a writer in a foreign journal), that the use of a large dose of bromide in the developer enables the distance to be preserved while detail is being worked up in the foreground and shadows. Nothing could be more erroneous, as it must be palpable that whatever developing action may be going on in the feebly-exposed portions of the image it must be at the same time producing a still greater effect in the relatively over-exposed distance; and, though it may not be immediately noticeable, the first application of the intensifier will render it only too plainly visible in the thickening and filling up of the better-lighted portions. It is quite possible in attempting to save the distance of an over-exposed landscape to give the remainder of the picture a character of *under*-exposure. We have seen very many so called under-exposed pictures whose *real* fault we have little hesitation in setting down to the opposite cause.

So far the experiments have been to test the latitude of exposure in connection with a modified development, the latter being arranged to suit the special circumstances; we will now turn to latitude of exposure under *similar* development. To test this we employed a bi-lens camera, giving to each half of the plate a different exposure, and developing with a view of ascertaining the limits between which the same treatment was capable of giving a *printable* result. It must not be supposed that we expect in this mode of treatment to obtain perfect results with two very different exposures; but, as there are several degrees between perfect success and absolute failure, we were desirous of ascertaining whether slow or rapid plates afford the greater security against failure from injudicious or improper development—to test, in fact, the comparative *latitude of development*.

With six-inch stereo. lenses and a quarter-inch stop we found the relative exposures for the two plates to be twelve seconds and one minute respectively; three pairs of plates were then exposed, one-half of each plate receiving an over-exposure amounting to twenty-five, fifty, and one hundred per cent. in the respective pairs. The results were even more distinctly in favour of the slow plates than in the previous experiments; for the rapid ones may be said to have broken down at the first step, while even with double exposure the slow ones gave comparatively satisfactory results. With only twenty-five per cent. of error the quality of either half was very little inferior to the standard.

Now, without wishing to "tread on anybody's corns," or to deny the right of using the most rapid plates to those who choose to do so, we must adhere strongly to the opinion previously expressed on this subject, that for the ordinary amateur and for ordinary purposes "slow" plates are much better calculated to give satisfaction. It must be borne in mind that the plates which we now dub "slow" would a few years ago have been justly entitled to a very different term. In warning our readers against the abuse of rapidity (for abuse it is when misapplied), we do not wish them to fly to the opposite extreme, because it is an undoubted fact, as shown by Mr. Charles Bennett, that the greater the normal rapidity of the film the better is it suited to the rendering of feeble detail. Plates of such a degree of rapidity as to combine this quality with the equally-important one of reliability are now easily prepared. Having pointed out the danger we are content to leave our readers to use their own judgment in avoiding it.

BLISTERING OF ALBUMENISED PAPER.

Those who aspire to albumenised photographs possessing a very high glaze have frequently to encounter an annoyance of a tantalising nature—the blistering of the surface. Much has been written concerning this evil, and numerous are the nostrums which have been recommended as a panacea.

We were recently conversing with Mr. John J. Atkinson, of Liverpool, on this subject, and he narrated a little incident which possesses some significance. A very highly- or double-albumenised sample of paper was supplied to a customer, who soon afterwards complained that, while in every other respect it was quite perfect, it blistered to such an extent as to render it worthless, This determined Mr. Atkinson to withdraw it from sale; but previous to doing so he forwarded samples of the same stock to several other photographers, requesting them to test and report upon it, taking the precaution of not giving a hint as to the alleged fault for which it was condemned. To his surprise, not less than to his gratification, in no single case was there any allusion to a blister having been produced. Determined to arrive at a solution of the discrepancy in results, and probably having a surmise as to the cause, Mr. Atkinson at length found that certain conditions, which were under the control of the photographer, operated in the production of blisters or of securing immunity from them.

When a paper heavily coated with albumen is thoroughly desiccated before being excited upon the nitrate of silver bath, the conditions under which the albumen loses its adhesion to the surface of the paper are so nearly complete as to cause numerous blisters to appear at a subsequent stage of the operation of printing. On the other hand, it is found that when the paper, while quite *dry* in the popular sense of the word, yet falls short of actual desiccation, the tendency to blistering is reduced. If the paper were placed in a damp atmosphere for some time previous to its being excited blistering would be impossible, because the albumenous coating would become in such a condition as to attach itself very firmly to the sizing of the paper upon which it is spread. By no possible means could paper that had been sensitised while in this state be brought to show any indication of blistering.

The chloride of soda in the albumen, owing to its deliquescent nature, conduces to the retaining of the albumenised surface of paper in a state far short of desiccation when it is kept in an atmosphere possessing an average degree of moisture; it is only when the atmosphere is exceedingly dry—a condition which does not infrequently occur during hot, dry summers—that such desiccation of the film takes place as to induce blisters.

From what has been said the real remedy for blistering will almost suggest itself. It consists in abstaining from sensitising the paper unless it be in a condition removed to a considerable extent from actual desiccation. There are various ways in which this condition may be induced. One of these, which is practically the best, consists in removing a small quantity from the dry stock-room or cupboard and transferring it to a cool, but not necessarily damp, room, from which it is taken day by day to be sensitised, according to the exigencies of business. The moderate change in the conditions under which the paper exists in the hot, dry cupboard has been found quite sufficient to secure the desired freedom from blistering.

It is also found by Mr. Atkinson and his friends that even when, during a period of great heat, drought, and consequent dryness of the atmosphere, the albumen is in a contractive and non-adhesive state, the ill effects of such a condition may be entirely overcome by adopting the expedient of passing a moist sponge over the back of the sheet, and allowing a little time for the moisture to percolate through the paper and influence the condition of the albumenous surface. When sensitised after this operation the prints obtained as the result of such treatment will prove all that can be desired as regards adhesiveness of the albumen.

This evil of blistering has been so prevalent during the past summer that we feel certain our readers will be glad to receive the hints respecting its cure we here give, consisting as it does of the matured experience of Mr. Atkinson, Dr. Liesegang, and other friends who have been engaged in subjecting this matter to the test of practical experience.

PROTECTING THE HANDS FROM CHEMICALS.

We have, on a previous occasion, incidentally alluded to the possible injury to the hands or the system generally from the continued exposure to the various liquid chemicals that a photographer in busy practice has so repeatedly to experience. The perpetual wetting of the fingers, even with the simple iron developer, their immersion in the hypo., and possibly in bichromate of potash solution or in the gold solution in toning, may seem simple causes, and not likely to have any ill effects; but it is well known to medical men and others that some agents which applied for a short time have no visible effect have, after a considerable number of repetitions, a very important action on the human economy. We do not, in this connection, allude to cyanide; the dangers from absorption of that poisonous compound have been too often pointed out to require any further cautions to be given.

We are led to a consideration of this subject by having frequently observed during the process of hand-shaking with the many photographers we meet with from time to time that so many of them have hands of peculiar dryness, and in more cases than one which we can call to mind the hands have been in a state that could only be termed diseased, the characteristics being the same in each case. The subject is rather a delicate one to advance before, perhaps, one who a moment before it was noticed was an absolute stranger; but to the body of photographers collectively we may address our observations, and we would here ask them to send their experience to us, if any of them have reason to believe that the pursuit of photography has had any effect upon their hands. The condition in the pronounced cases we have noticed had attained a point far beyond the dry stage, till the skin had a kind of scaly roughness, and an actual sore had formed.

We think that, pending the obtaining of sufficient data to form a proper judgment upon, photographers would do well to consider whether they could not more efficiently guard their hands against the possible danger, as the result, if merely to obtain more sightliness—which absence of stains would entail—would be worth some pains to secure; for if it were possible to remove the reproach of stained fingers from the practice of the art we think a very popular step would be taken. There are naturally but two ways in which progress in this direction could be made, beyond that extra carefulness which there is no need for us to impress upon operators generally—in the first place, a more free use of such mechanical aids as the plate-holder, pneumatic or otherwise; and, in the second, the adoption of some covering for the hands.

With regard to plate-holders: if their use were more common there cannot be a doubt that clean workmanship would be more common, and the great aid they are in preserving the fingers from stains we know from our own experience. We have found the solid red india-rubber pneumatic holder, attached to the end of a long handle, invaluable for the dark room, and we are able to use it with comfort for plates up to fourteen inches. True, there are some who object to its use on the ground of waste of time; but we have tested it ourselves, going through all the operations of taking a plate from the dark slide and applying the developer a certain number of times with and without the use of a holder, and we have found that when done in a systematic way, and the holder left in a particular spot, there was not the slightest loss of time from using it; in fact, if anything there was a gain.

As coverings for the hands there are finger stalls and gloves. The former may do for occasional use for a special purpose, but are quite out of the question for operating in, for the stains would extend beyond the limit of their length; and, beyond that, it is very injurious to the system to cover any part of the skin closely for any length of time by a substance impervious to air.

We have now to consider the use of gloves, and we most unhesitatingly recommend a pair of india-rubber ones for universal adoption by all photographers to whom the handling of chemicals is, or may be, injurious, and to all who desire the hands to possess a presentable appearance the whole working day through. There is a great prejudice against their use, on the grounds that they are "namby pamby," not "businesslike," &c.; but we have not a doubt that anyone who may give them a fair trial sufficiently long to get used to them would never be without their aid again. Some photographers make a point of using them occasionally during the working of large plates, and on one hand only; but what we wish to recommend is their invariable use in the operations of developing in particular, and in any other when danger is apprehended from the contact of chemicals with the cuticle. The gloves should not be kept on the whole of the time, but merely put on for the special moment and taken off as soon as possible. Perhaps the bulk of professional photographers do their own posing and the developing of the plate, an assistant performing the other operations; to such the gloves will be of great value. As soon as they enter the dark room the gloves are put on and the developing—that part of the dark-room work which entails most stains, &c.—performed; the gloves are then removed, and the studio entered again with hands free from stain and other injurious action of chemicals only half washed off, for the busy man cannot thoroughly cleanse his hands between every plate he developes. We wish our readers to adopt our recommendation for a week. We are very confident of the result.

A word now as to the gloves themselves. At the india-rubber or waterproof material warehouse many kinds of gloves will be found; the kind, however, to be used by photographers is not the solid india-rubber glove, but that made of a material like the well-known waterproof overcoats—a thin, woven material, covered on one side with a thin coating of india-rubber. There is not so much wear in them by a long way as the solid rubber, but the latter are useless from the length of time taken to get them off, owing to the rubber clinging to the skin; indeed, when inspecting a variety of gloves we found on trying one of this kind on that we could not get it off, and on inquiring of the shopkeeper were informed that the right way was to "peel" them off, turning them inside out in the process. But the cloth-lined kind slip on and off with the greatest ease, provided the right size be selected at first. They work a little easier with constant use. They have a drawback, viz., the seams (which are strongly sewn, and then covered with thin rubber cemented on) are liable to burst or break into fine holes, a single one of which, though almost invisible to the unaided eye, will let in a very large quantity of liquid. The maker, however, would repair them for a trifling sum.

Here is our final advice with regard to their use, with which we will conclude:—There is constantly given out from the skin aqueous vapour, and this condenses on the gloves, so that after a good day's photographing the gloves will be found quite damp inside, and will not come on and off easily. Therefore, every evening after the day's work is over it will be found advisable, indeed necessary, for comfort and to preserve the gloves *sweet*, to turn them inside out, wash with a little soap and water, and then by next morning they will be ready for use again, and always pleasant to use.

THE TECHNOLOGICAL EXAMINATIONS BY THE SOCIETY OF ARTS.

Bearing in mind that a short time ago we recorded a grant of seven pounds by the Photographic Society of Great Britain to the prize fund of the Society of Arts, in aid of their technological examinations, we are now in a position to give some account of these examinations, having received the programme for the ensuing year.

This Society has had for several years in operation a system of examinations in the technology of trades and industries; and the principle on which it is established is to encourage those engaged in any handicraft to combine with their manual dexterity a certain amount of the science underlying their operations. In the list of subjects already embraced in the programme for the coming year photography is included.

On the subjects in general of these examinations it is essential that the candidate (who must be actually engaged in the special branch of industry in which he desires to be examined) should, in order to pass, possess, in the first place, such an elementary knowledge, at least, of abstract science as will enable him thoroughly to understand the scientific principles of which his art or manufacture is an application; and, in the second place, such a knowledge of the application of those principles in his trade as will show that he is practically conversant with the various processes and manipulations of the factory or workshop. The theoretical knowledge must not be a mere "cram" of empirical dicta; nor the practical knowledge a mere committal to memory of descriptions of manufactures picked up from text-books.

The examination in each industry may, therefore, be considered in three parts. The first part includes those branches of science a knowledge of which is requisite as a foundation for sound technical instruction in that particular industry. The second part relates to the technology of the manufacture, or the special application of the various branches of science to it. The third part relates to the practical skill in the manufacture itself.

The candidate's knowledge of general science will be tested by the May examinations of the Science and Art Department. The examination in technology will be by a special examination paper, to be worked in conjunction with these examinations. The practical skill will be judged by the returns of the candidate's employment, for some time past, in the particular art or manufacture. In those branches of industry in which free-hand and mechanical drawing, painting, and designing for manufactures are required the candidate's power will be tested by the examinations of the Science and Art Department, and on the result of the combined examinations the Society of Arts will award certificates. These certificates will be of three grades, according to the proficiency of the candidate:—

(1.) The elementary grade.
(2.) The advanced grade.
(3.) Honours.

Each grade will further be subdivided into two classes—first and second class. A candidate who has obtained an elementary or advanced certificate may be again examined for one of a higher grade in a future year.

We now proceed to show the special application of these general rules to the examination in the general science, the technology, and the practical knowledge of the competitor in photography, premising that he may elect to be examined in all or any of those branches mentioned.

Part I.—General Science.

1. *The Elementary Certificate.*—For this certificate the candidate will be required to have passed in the elementary stage of the following subjects:—

Subject 10.—Inorganic chemistry.
Second grade art (free-hand drawing).

He may then count marks in any of the other subjects given in technology.

2. *The Advanced Certificate.*—For this certificate the candidate will be required to have obtained at least a first-class in the elementary stage of—

Subject 10. Inorganic chemistry,
Also a second grade art (free-hand drawing and perspective),

and to have passed in the elementary stage of—

Subject 8. Acoustics, light, and heat.

He may then count marks in any of the other subjects given in technology.

3. *Honours.*—For honours the candidate must have at least passed in the advanced stage of the science subjects given in paragraph 2, with a second grade art (free-hand and model drawing and perspective). He may then count marks in any of the other subjects mentioned in paragraph 4.

4. The following branches of science are more or less involved in the practice of photography, and may be studied with advantage:—

Subject 1. Practical, plane, and solid geometry.
,, 8. Acoustics, light, and heat.
,, 10. Inorganic chemistry.
,, 11. Organic chemistry.

The student may also with advantage take up practical geometry, free-hand, and model drawing (second grade art).

Part II.—Technology.

5. The characteristic properties of pyroxyline for the manufacture of collodion and the various substances employed for the purpose, as well as the solvents, such as ether, alcohol, wood naphtha, &c.; different qualities of collodion.

6. The various processes, both wet and dry—including the daguerreotype—and the principles involved in each; emulsions, both with collodion and gelatine; paper processes, developers, acid and alkaline intensifiers, &c.

7. Processes for portrait work, landscape work, copying pictures, maps, engravings, and documents of all kinds; printing in silver and other metals, in carbon, Woodburytype, vitrified enamels; toning and fixing.

8. Special applications of photography to engraving, typography, photolithography, including the various processes for collotype, &c.

9. Special applications of photography to astronomical and microscopical purposes, as well as for recording meteorological and other observations.

10. Lenses and the various purposes for which they are specially adapted; the construction of cameras and other apparatus, &c.

Part III.—Practical Knowledge.

11. The candidate must forward to the Society of Arts a certificate, on a form supplied on application, certified by his employer, stating the nature of his employment in a photographic establishment, and showing that he is practically conversant with at least one branch of the art. He may also be required to send specimens of his work.

Prizes.

The following prizes are offered by the Society of Arts in each of the fifteen subjects* to such candidates only as obtain first-class certificates:—

To the best candidate in honours, £10.
To the best candidate in the advanced grade, £7.
To the best candidate in elementary grade, £5.

The following special additional prizes are offered:—

By Wyndham S. Portal, Esq., to the second and third best candidates in the elementary grade, paper manufacture:—

A prize of £3
A prize of 2

By G. N. Hooper, Esq., to the second and third best candidates in the elementary grade, carriage building:—

A prize of £3
A prize of 2

By J. W. Peters, Esq., to the second best candidate in the advanced grade, carriage building:—

A prize of £3

By the Worshipful Company of Spectacle Makers, to the second best candidate in honours, in the advanced grade, and in the elementary grade respectively, in the manufacture of glass:—

A prize of £5 5
A prize of 2 2
A prize of 2 2

By the Photographic Society of Great Britain:—

A prize of £7

A candidate cannot take a prize of the same grade more than once, and, having taken a prize of any grade, he cannot take one of a lower grade in a subsequent year.

REMINISCENCES OF A VISIT TO DUBLIN.

No. II.

While there are numerous localities in and around Dublin that will repay well the visit of the photographer who goes forth in quest of fine scenery, it is unquestionably in Wicklow—which is situated happily within easy distance of the capital—that the beauties of nature, not altogether unaided by art, are to be found in the richest profusion. To this "garden of Ireland," as Wicklow has long been designated, the eyes of the members of the British Association were turned as to a scene where they could revel with the least possible amount of travelling or of personal discomfort.

The lovely town of Bray, which lies on the shore of a fine sweeping bay, may be regarded as the key to, or the starting-point for, the tit-bits of the mountain scenery of Wicklow. Bray should be made the head-quarters of the nomadic artist who desires to "do" a week's photographing amid scenes which, for the extremes of grandeur and quiet sylvan beauty, it is almost impossible to find surpassed anywhere.

Bray is situated about twelve miles from Dublin, and is a favourite summer resort of the citizens, many of whom take up their quarters here at the commencement of the bathing season and remain till the chill winds of October remind them that it is time to leave their temporary marine residences. Bray Head is a lofty, rocky promontory which bounds the beach on the south; and it is not easy to account for the paucity of fine photographs which may either be obtained from or of this fine headland. Below on the right are jagged, precipitous rocks projecting out of the sea; in front are seen in the distance the Hill of Howth, Kingstown Harbour, Dalkey Island, Killiney Hill, and at the spectator's feet reposes the town of Bray, with its silver sands crowded with visitors seeking health and enjoyment. It would be easy to fill a folio with

* Which we do not here enumerate; it is enough to say that photography forms one of them.—Eds.

charming photographs obtained here; but for some reason the professional landscapist does not appear to have considered it worth his while to do such justice to this favoured spot as its merits demand, or, if he had done so, we, at anyrate, failed during the period of our visit to Ireland to see such evidences of it as we had expected. As we hinted in our last article, Dublin is well situated with regard to the number of professional portrait photographers; what is required to do justice to Wicklow scenery is a band of amateurs who, working for pleasure alone, are in a better position to devote time to the discovery of the numerous scenic gems in which the locality abounds.

Evening was approaching when we started from Bray, and, accompanied by genial friends, we walked to the Dargle. This sylvan solitude is a deep ravine, at the bottom of which flows the dark mountain stream from which the name of the glen is derived. It is only in certain dispositions of the light that the ordinary monocular camera could do any justice to this weird scene of sublimity and beauty. To photograph it as it ought to be done, so as to convey an adequate idea of its picturesque aspect, recourse must be had to the binocular camera, the dissimilar images formed by which, and combined in the brain through the agency of the stereoscope, will alone afford a just conception of the imposing scene.

Here we have precipitous cliffs of vast height, one of which—the "Lover's Leap"—was pointed out by one of our friends as, half hidden, it lay on the opposite side of the ravine embowered in verdure which almost concealed its natural beauty; there we find winding paths down the sides of the mountains on both sides which lead to the base of the beetling cliffs, where amid rocks and through chasms rushes the foaming torrent, ever and anon losing itself amid wooded depths and overhanging banks seen impending on either side. From this to the summit of the sides of the glen the foliage is singularly rich and prolific, being composed of oaks, firs, larches, and other trees, with an undergrowth of myrtle, laurestinas, briar, woodbine, and dog roses. It was rather too early in the season to see this grand scene enriched with the golden tints of autumn; but we could well imagine what it would be. Here we advise the tourist photographer to wander, for he will find much choice food for his camera. Only one precaution with respect to his chemicals will be needed—the foliage towards the bed of the torrent is but dimly lighted, and the rocks are of an exceedingly-dark colour, therefore his plates must possess great sensitiveness—more especially must they be very sensitive to those rays commonly designated "non-actinic."

In this neighbourhood is to be found the beautiful village of Enniskerry, of which we can only speak the sentiments of others, time not permitting our extending the walk in that direction. It is situated in the demesne of Lord Powerscourt, and as respects picturesqueness of situation, cleanliness, and inherent beauty it is believed to be almost without a rival in this or any other country. Many of the members of the Association availed themselves of the courteous invitation of Lord Powerscourt to visit the scenes of romantic beauty on his estate, including the famous Powerscourt Waterfalls, which are upwards of a hundred feet in height. Here there is much that will prove most enticing to the artistic photographer.

In Wicklow, too, are other scenes dear to artists and to photographers, and of which we have seen displayed in Dublin several fine photographs. We allude to "The Devil's Glen," "The Seven Churches," and Glendalough, with the fine round tower—an emblem of a form of worship now extinct. How seven churches came to be erected in a solitary mountain-girded position no one appears to have offered any explanation. We are, therefore, free to imagine that one church only originally stood there, and when it fell into a state of disrepair it was found to be cheaper to erect a new one than repair the old one. Hence, probably, the *seven* churches.

From the few remarks here made, and which are chiefly of a topographical nature, it will be seen that the members of the British Association enjoyed no common opportunity for gratifying their love of the beautiful in nature, and that those among our readers who are landscape photographers and are a little uncertain in which direction to travel with their cameras in search of health and fine scenery may with excellent effect visit Ireland. Dublin is easy of access from Euston and other railway stations. One may start from London in the evening, and at seven o'clock next morning be in that famous old city and within an hour's railway journey of the scenes we have faintly endeavoured to depict.

There is scarcely a branch of photography in which gelatine is not in one way or another capable of serving some useful purpose; but beyond a doubt its most valuable feature is found in its reactions with chromium compounds, upon which are based nearly the whole of the numerous methods of permanent impression now practised. For "tissue" making purposes and ordinary carbon printing it answers admirably every purpose required of it, and it would, perhaps, be difficult, if not impossible, to find an efficient substitute; but in many other processes—as, for instance, the numerous modifications of printing in fatty inks—it has been already superseded, wholly or partially, by other substances, foremost amongst which we may mention albumen and gum arabic. For still another class of work the list of substances which behave in an analogous manner may be further extended, nearly all, if not all, the albumenous, gelatinous, and vegetable gummy principles possessing the peculiarity of becoming insoluble under the action of light (and sometimes without such action) when combined with chromic salts. For some purposes the necessity of heating the gelatine in order to render it fluid forms an objection to its use; in others, on the contrary, it is a positive advantage, or, rather, the fact that it is insoluble in cold water constitutes the advantage. In addition to gum arabic the vegetable kingdom supplies a number of substances which have been utilised in this direction—such as starch, dextrine, gum tragacanth, and probably many others which have never been tried. One of the latter—mucilage of linseed—we have found most convenient and efficient, as well as inexpensive, for various purposes; but it seems especially adapted to the requirements of the "dusting-on" process, forming a perfect substitute, and in some respects an improvement upon the usual gum and glucose or dextrine mixture. It acts admirably with no further addition than the necessary quantity of bichromate and a drop or two of glycerine according to circumstances. We have also applied it successfully in forming an insoluble surface upon paper for transfer purposes, and as a substratum for dry plates. It also forms a cheap and ready means of waterproofing dishes of paper or wood for developing and other purposes, and may fulfil many other requirements in the laboratory of the amateur.

PARIS INTERNATIONAL EXHIBITION.

The distribution of the medals and prizes at the Paris Universal Exhibition has been a cabinet question, and is not to take place this month, simply for this grave reason—that at the date first inconsiderately named neither of the chambers of the senators and deputies would be sitting, and their members being at the present moment dispersed all over France in their respective localities would, therefore, not be present, or would incur great inconvenience, loss of time, and expense to come expressly to Paris for that event. The administration has, therefore, too late found this out, and fearful that they might be badly received by the chambers on the monetary questions which *will* arise at the final close of the Exhibition, have found it really necessary to adjourn the distribution of awards until the chambers are sitting, so that the senators and deputies can very properly take their part in the ceremonial. The distribution of medals, &c., has been postponed until October 21. This change had a very disagreeable result, for the Mareçhal de Macmahon had invited the crowned heads of Europe and all the great personages thereof to add *éclat* to this display. He became *furious* at having to announce the delay, which again raised the question of his resignation.

Awards (First List).—Class 12.

Gold Medals.—Vernon Heath, Henry P. Robinson.

Silver Medals.—William Bedford, Autotype Company, Elliott and Fry, Robert Faulkner and Co., Alexander Henderson, Payne Jennings, Notman and Sandham, Robert Slingsby, Leon Warnerke.

Bronze Medals.—Charles Ernest Bartoux, Albert Boucher, T. M. Brownrigg, Samuel Fry, George Hare, David Hedges, A. L.

Henderson, Liverpool Dry-Plate Company, London Stereoscopic Company, Mawson and Swan, W. L. H. Skeen (of Colombo), William Sherlock, H. Vanderweyde, Frederick York. W. Harrison.

Asnières (Seine), Paris, Sept. 14, 1878.

[In addition to the medal awards above given by Mr. Harrison, our Paris correspondent, which are confined to Class 12 (Photographic Proofs and Apparatus), we understand that in Class 15 (Mathematical and Philosophical Instruments) gold medals have been awarded to the two leading photographic optical firms of London, whose names have so long been associated with the manufacture of photographic lenses. But concerning these, and doubtless many other awards, we are unable to say anything in a more definite form until the award list has been officially and fully published.—Eds.]

BLUE BROMIDE FILMS AND OTHER MATTERS.

From Mr. W. B. Bolton's remarks at page 423 of The British Journal of Photography it appears that he had not realised the fact that a bromised film, possessing a blue tint by transmitted light, is capable of yielding a negative of printing density. It is true that a washed emulsion of this class has a decided tendency to give thin images; but for some time past "blue" emulsions have been regarded not entirely with disfavour. It was only after a considerable number of trials that I succeeded in producing a blue emulsion, and I have never been able to determine a certain method of doing so. When this peculiar form of emulsion was first produced I believe that the albumen introduced into the collodion was supposed to influence the silver bromide physically. This idea, however, appears untenable, as the presence of albumen is unnecessary.

I am inclined, nevertheless, to think that where this formation of the silver bromide takes place the albumen confers the property of density, hardly obtainable without it. In varying my formulæ I never know what kind of emulsion will result—whether red, orange, yellowish, or blue, purplish-blue, or greenish-blue. The last emulsion I made was *intended* to be as rich in colour as possible; instead, however, the emulsion turned out much like that described by Mr. Bolton as having been kept twenty-four hours after sensitising. It seems probable that weak solvents, or the addition of water to the alcoholic solution of silver nitrate used for sensitising the collodion, may conduce to this effect, which is, after all, a form of granulation of the silver bromide. Methylated solvents, I am inclined to think, favour the production of the ruby variety of emulsion. Mr. Bolton writes:—"I have used zinc frequently under almost identical circumstances and never attained a like result." This was just my case. Now, "blue results" are the rule. When such an emulsion (without albumen) is washed, even after thoroughly drying the pellicle previously to washing, as advocated by Mr. Bolton, the results on development are slow, thin, and poor.

I do not remember having noticed a blue film become warmer in colour on moistening with alcohol; but I have an emulsion that gives a film which, when still in the moist condition, is blue, or nearly so, by transmitted light, but which, when dry, transmits yellowish rays, though the film is so dense that with a strong light, and with shaded eye, it is difficult to perceive any colour; on moistening with alcohol the film becomes more transparent.

This effect is probably caused by a shrinking of the film during drying, whereby the particles of bromide are brought closer together.

To revert to another subject: I thought that it was usual to prepare transfer paper with a coating of sulphate of barium incorporated with the gelatine. This being the case, how does any discolouration of the paper become apparent?

Yet another query: will citric acid attack silver sub-bromide in an emulsion? If so, how? Herbert B. Berkeley.

OBSERVATIONS ON THE EMULSION PROCESS.

[A communication to the Photographic Society of France.]

In the preparation of an emulsion by the method of M. Chardon the orange tint which the bromised collodion takes after sensitising with nitrate of silver in slight excess is an index of success. This fact has been recognised by the inventor of the process, and has been given by several writers as an unfailing test of quality. Such an emulsion poured upon glass a short time after sensitising gives a transparent film of a reddish-orange colour by transmitted light, and which, washed in distilled water, furnishes plates the dried films of which are hard and brilliant, and intensify without the slightest difficulty with the alkaline developer alone.

We proceed, however, to precipitate the same emulsion afte having neutralised the excess of silver with chloride of cobalt; th powder thus obtained, washed, dried, and redissolved, gives result but slightly different if the bromised collodion be not too old, bu absolutely opposed if the collodion be ten months or a year old.

In the first case, if the collodion be not too old, the film obtaine with the redissolved emulsion will be a little less brilliant and tran parent and of a reddish-yellow colour, the intensification by mean of the alkaline developer alone being less easy. In the second cas (with old collodion) the powdered emulsion gives matt, dusty film of a lemon-yellow colour by transmitted light, and the image refuse to intensify either with the alkaline developer or with pyrogallic aci and silver. This want of success may, it is true, be reduced i a certain measure by employing a larger quantity of *coton resistant* but then the sensitiveness of the films will be greatly diminished which is to be avoided.

This modification in the state of the emulsion, which from excellen becomes bad by the mere act of precipitation, can only, in my opinion be attributed to that operation. The careful study of M. Chardon' pamphlet has enabled me to apply a simple remedy for the defect.

During the precipitation with warm water it seems that th cellules of pyroxyline which contain the silver bromide burst in con tact with the hot water, owing to the tension of the vapour of ethe and alcohol. These broken cells then permit the bromide to escape which latter agglomerates in the form of coarse, granular particles.

Several writers have admitted that the granular form of bromid is in reality sub-bromide of silver, Ag_2 Br. According to this hypo thesis it may be said that the bromide of silver, Ag Br, in the stat of fine division and in contact with a large quantity of hot water, i decomposed to Br and Ag_2 Br, just as carbonate of silver in th presence of a large quantity of boiling water produces sub-oxide o silver, Ag_2 O. Accepting this hypothesis, it would appear that it i only necessary to precipitate the emulsion in the presence of bromin water or in a solution containing chloride of cobalt in order to preven the formation of the granular sub-bromide, whereas experienc proves that the latter is formed in spite of such conditions. I an inclined, therefore, to believe that the coarse bromide is only a mole cular modification of silver bromide, Ag Br. Without disputing th existence of the sub-bromide, Ag_2 Br, I may repeat the followin experiments, which tend to prove the correctness of my hypothesis:—

1. If we sensitise with nitrate of silver a bromised collodion re cently prepared, we obtain a large proportion of the coarse form o bromide. (For the explanation of this see M. Chardon's *brochure.*)

2. If to an old bromised collodion we add a fresh quantity of *coto resistant*, and after the lapse of some little time we sensitise it, w obtain a powdered emulsion of good quality. I may remark that in this case we merely augment the resistance of the cellules to the tension of the vapours of ether and alcohol.

3. If we take a quantity of this same emulsion, dilute it with a large quantity of ether, and precipitate it in hot water, we shall obtain the granular bromide as a consequence of my hypothesis. In fact, the resistance of cells of pyroxyline remaining constant the tension of the ether vapour has augmented, and consequently we have bursting of the cells and formation of the granular precipitate.

My theory explains sufficiently well the facts, and has enabled me to apply a remedy for the defect. If we study the experiments last cited we shall see that, given an emulsion producing good results previous to precipitation, if we desire to ensure identical results after the performance of that operation we shall have to adopt one of the two following courses:—

1. Precipitate the emulsion after having concentrated it. In summer it will suffice to leave the bottle uncorked for twenty-four hours previous to precipitation; or, better, uncork the bottle and cause it to revolve so as to allow the emulsion to flow repeatedly over the whole internal surface, which will favour evaporation. (This method is identical with that suggested by M. Plücker, if my memory serve me.)

2. I prefer the following method:—After neutralisation with chloride of cobalt allow the emulsion to rest for ten hours; shake it vigorously and pour it into a porcelain dish. When the surface has become solid divide it by means of a spatula of platinum or glass, and pour on to it a quantity of hot water equal, at the most, to the quantity of emulsion employed; by means of this spatula the tufts of precipitated emulsion are collected and transferred to a precipitating glass. After changing the water several times the precipitate is thrown on to a cloth, filtered, and finished in the usual manner. I prefer to employ alcohol for the last washing.

The powdered emulsion thus obtained differs in appearance from that produced by M. Chardon's method. It should be placed to soak for some time (an hour) in the alcoholic solution of quinine which is used to form the final emulsion. The latter is of a ruby red-colour, gives films brilliant and transparent, and which intensify with the alkaline developer alone.

Let me add, in conclusion, that if before sensitising the bromised collodion we add to the latter about two per cent. of nitrate of uranium rendered slightly acid the rapidity is considerably augmented and the negatives are more brilliant. I shall be happy if these few remarks prove useful in extending the practice of M. Chardon's process, or in causing its adoption by amateurs who, discouraged by a first failure, have set aside this admirable process. M. Fabre.

RESULTS OF EXPERIMENTS IN CONNECTION WITH DARKENING OF TRANSFER PAPER.

At page 412 of the number of The British Journal of Photography, published on August 30th, I stated that papers from several mills in various parts of the country had been collected and some of them prepared in various ways, and all submitted to the action of direct sunlight. The exposure has now lasted thirty days, and the result is highly creditable to the principal Scotch manufacturers, while, at the same time, it indicates pretty clearly what may be used and what should be avoided.

In the first place, it is quite clear that neither the gelatine or chrome alum are causes of discolouration, as it is impossible to notice any difference between the specimens prepared with those substances and those not so prepared. Neither do the various methods of sizing seem to have any influence in bringing about discolouration or preventing it, and, therefore, we are constrained to look to the material of which the paper is composed for an explanation of the evil. The majority of the samples experimented with were slightly tinted, or rather brightened, by almost imperceptible shades of blue, red, or yellow, and in all cases those tints completely disappear during the first few days' exposure; but beyond the disappearance of the tint no visible change had occurred, except in two specimens which became slightly yellowish, showing that the bleaching of the pulp had been imperfectly carried out.

This fact plainly indicates "natural colour" papers as those most suitable for transfer purposes, and of these there were three varieties included amongst the experimental specimens—paper from pure rags, from a mixture of rags and esparto, and from esparto alone. Before exposure to light these specimens were equally good in colour, but not so bright or purely white as some of the others; but a few days' exposure showed a marked degradation in the esparto varieties, and at the end of a week a perceptible change had also occurred in those of esparto and rags. The colour in both kinds continued to deepen, till, as they lie before me now, the exposed parts are not far from what is known as a "French grey." The pure rag specimens, on the other hand, are quite as pure in colour as before exposure, so that without examining the jotting at the back it is quite impossible to say which is the exposed and which the protected half.

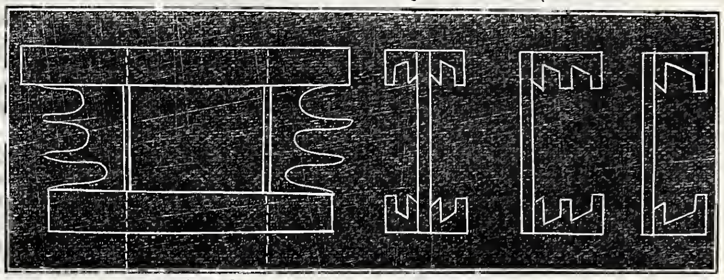
From all this it would seem perfectly clear that there need be no difficulty in getting suitable paper for transfer purposes, all that is necessary being to see that it is made from pure rags and of the variety known as "natural colour"—that is, bleached sufficiently by the usual chemical method to render unnecessary the giving of an adventitious brilliance by the addition of colouring matter of any kind. John Nicol, Ph.D.

A REALLY EFFICIENT REGISTERING AND EFFECTIVE LANTERN-SLIDE CARRIER.

[A communication to the Manchester Photographic Society.]

This carrier entirely obviates the nuisance of having to remember the size of the slide put into the lantern some time previous, and also the necessity of having to go through a course of lessons on numbers, names, and sizes, and then not being able to register only about one-half the slides. All that is necessary is simply to remember that there are three sizes of lantern slides in common use—York's, Ferrier's, and Woodbury's—and whichever one is shown on the screen the operator has simply to put it into the carrier and push it as far as its slot will allow. What can be simpler?

The slides can be registered from either side of the carrier. This in itself is a great advantage over any carrier which can only register from one side. Another advantage amongst the host possessed by this carrier is that the operator is not compelled to reduce the size of his pictures and to have them always one shape, which may cut off an important portion of some pictures. The pictures may be of any shape wished by cutting a paper, card, or tin mask the desired shape and putting it into the slot made in the carrier for that purpose; and by having a variety of masks (which would cost



almost nothing) the shape of the pictures may be altered at will, or the pictures may be left the shape the manufacturer thought best.

The same slot allows a blank, either dark or coloured, being used to imitate the curtain rising or falling, or a strip of paper or glazed calico pierced to imitate falling snow or other effects; or, by having very pale cold glass or gelatine as slides for the extra groove, various tints on the screen may be obtained, and by using two different colours as one slide variety may be secured without adding to the bulk. By using blanks, either dark or coloured, in the same groove side-wings opening and closing either from the side or centre may be imitated, or the pictures may be shown opening from the centre either vertically or horizontally any shape or colour. The slides may be passed through the carrier panorama fashion, or produce a peculiar effect by passing the slides along both grooves. After using springs in my slide-carrier for years I now find them quite unnecessary, as making the groove very slightly inclined answers every purpose. By having two very small rollers attached to the carrier, with a small piece of elastic tubing drawn over them and a small handle to the end of one roller, you may have some of the effects to move in the most even manner.

This carrier—with which can be registered the pictures on the screen any shape, and have an almost endless variety of effects without disturbing either carrier or lantern—is, I think, by far the most portable carrier I have seen. It measures *seven* inches long, four and a-half inches wide, and less than three-quarters of an inch thick, and weighs only *three ounces three drachms.*

The construction of the carrier will, I think, be easily understood from the above rough sketch. David Young.

PHYSICS IN PHOTOGRAPHY.*

We have hitherto treated the question of a sensitive compound from what may be called a chemist's point of view; but it has also its physical aspect, and to enable us to understand what has recently been done in photography this latter must be briefly touched upon. To commence with, we are met with a difficulty in nomenclature which ought not to exist. Unhappily chemists and physicists employ the term molecule in a different sense. The physicist's molecule, for instance, in one place is defined† as "a small mass of matter the parts of which do not part company during the excursions which it makes when the body to which it belongs is hot." To avoid misapprehension the expression molecular group will be used for the physicist's molecule for want of a better, the word particle being rather too indefinite, and being usually applied to a group of molecules of visible size—a state of aggregation which is by no means necessary. The question as to the possible variation of the number of molecules composing a molecular group has not been entered into, as it would be trenching on ground which has been explored by others in relation to a different subject; but this may be stated as a matter of observation—that some compounds of silver which are sensitive to light are capable of forming two molecular groups, one of which absorbs the blue rays, and the other the red rays.

The iodide and bromide are the salts of silver which, either separately or together, are chiefly employed for securing a developable photographic image; and it is these with which we shall principally deal, though the chloride and one or two other combinations will come under review when considering certain new phases in photography. The points to which attention must now be directed are the radiations to which these compounds are sensitive; and these are evidently dependent upon the absorption that takes place in them individually. If we take precipitated silver bromide and fuse it into a crystalline mass, and examine it spectroscopically, we find that it energetically absorbs all rays from the extreme violet to the green, and also less markedly in the yellow of the spectrum; whilst if we place a slab of it before the slit of the spectroscope, and photograph the spectrum of white light passing through it, we find that it completely cuts off the ultra-violet rays; so that we may say that the red and perhaps the ultra-red rays are the parts of the spectrum in which but slight absorption takes place. Now, since

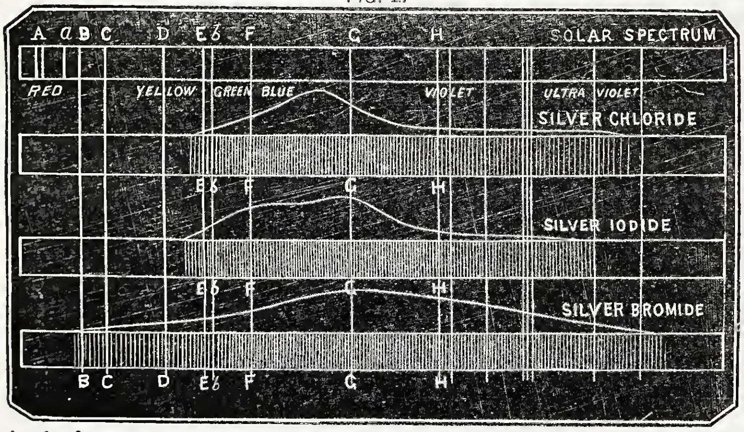
* Continued from page 438.

† *Theory of Heat*, Maxwell.

absorption means work done in the absorbing body, it is evident that we may expect some action to take place in the silver bromide when exposed to these rays; and the action may be a chemical change or a rise in temperature, it being remembered that the latter may co-exist with the former, since it may be produced by the result of chemical action as well as by the absorption of the radiation. The question, then, arises—On what does the possibility of a chemical change in a compound depend? This is a question very easily asked but not so easily answered. It must evidently depend, amongst other things, on the capability of the molecules of the compound to throw off some atom or atoms, or on their capability of acquiring some vibrating atom or atoms of a body with which they may be brought into contact; in other words, that the molecule shall be in a state verging on indifferent equilibrium, and seeking re-arrangement of the atoms when the impulses of the waves forming the radiations impinge against it. Taking for granted that the chemical theory of the formation of the photographic image holds good, we know that the atom of the halogen is thrown off from the molecule of the silver compound behind two atoms of the metal combined with one atom of the halogen. Thus, silver bromide (Ag_2Br_2) is split up into argentous bromide (Ag_2Br) and bromine. If a film of the yellow sensitive salt be exposed to the spectrum an image is developed on all the parts which it absorbs; in other words, absorption in this case means chemical action. Similarly with the iodide: where the absorption of radiation is most energetic there we have a chemical change. With the chloride we have a different phenomenon; crystalline chloride is nearly colourless, and the absorption of every part (though not necessarily of the invisible regions) of the spectrum must be nearly equal; but we find that this salt is sensitive only to about the same radiations, under ordinary conditions, as the iodide. An explanation of this will be offered at a more advanced stage of these articles, but it may be as well to note the fact now. In the accompanying diagram the ordinary results of the exposure of the three chief silver compounds to the spectrum are shown (*fig.* 2).

When we obtain a molecular grouping in which the red is absorbed, we may expect that the same chemical change may take place as when

FIG. 2.



in the former state. This is not a necessity, since, instead of a reduction to a less complex form of molecule, the new compound, formed by the aid of light, might be rendered more complex by annexing other foreign atoms. An example of this we have in Hunt's experiment, already quoted, where it is evident that the violet sub-chloride would be sensitive to light if it were proved that light alone caused the absorption of oxygen. Again: in the combination of chlorine and hydrogen, when exposed to light, we probably have a greater complexity of molecular structure introduced.

In the ordinary state in which silver bromide is formed in a collodion film (we will take this compound as it is the one which has been principally examined), we have it in the state in which the blue is absorbed and the red transmitted; but there are means by which it may be made to absorb the red. We may obtain the bromide in either state by what is known as the "emulsion process." Briefly, this process may be described as one in which an emulsion of silver bromide is formed in a viscous liquid, such as collodion or a solution of gelatine, by first dissolving a soluble bromide in it and then adding to it a solution of silver nitrate. The particles of solid bromide thus formed remain suspended in the fluid. In the emulsion with collodion we can get the silver bromide in various states according to the rapidity with which we add the silver nitrate. Thus, if we add it rapidly, we get a mass of silver bromide which is coarse and has a tendency to subside, and which, when poured upon a glass plate and dried, gives a film transmitting white light; whilst if we add it drop by drop and shake it up between each addition we find that the bromide remains suspended for days, and that a film of it transmits orange light. If we take the emulsion, however, as first described, and place it in a still, and bring it to a state of ebullition, distilling over the ether and alcohol solvents of the collodion, thus breaking up the heavy particles of the suspended bromide, and then wash the contents of the flask in water to get rid of all soluble salts (which must necessarily exist owing to the double decomposition of the soluble bromide and the silver nitrate), we shall find, on redissolving the mass, after washing with alcohol, that the film will transmit lavender or a sky-blue light. On the other hand, if the solvents from the emulsion which transmits the orange light be allowed to evaporate spontaneously and the solid residue be then washed and redissolved, the film will still transmit red light. It will thus be seen that silver bromide may be secured in two states, *in one of which it principally absorbs the blue and in the other the red.* The chances are that the former is sensitive to the less refrangible rays of the spectrum, whilst the other is only sensitive to the more refrangible rays.

The emulsions, if made exactly as described above, might or might not give a film which, after exposure to the image formed in the camera, would develope without blackening all over under the action of the developer, or, in photographic *parlance*, might or might not develope without fog. If the soluble bromide be in excess in the emulsion, and be then washed out as described, the sensitive films would be free from this evil; whereas if the silver nitrate were in excess this would not be the case. The cause of this difference in behaviour has lately been explained, though the means of correcting the emulsion has long been known. The reasoning will perhaps be rendered more clear if the experimental proofs be recounted in the order in which they were made. W. DE WIVELSIE ABNEY.

—*Nature.*

(*To be continued.*)

AN APPARATUS FOR THE FILTRATION OF THICK FLUIDS, ESPECIALLY ADAPTED FOR THE FILTRATION OF GELATINE FOR THE CARBON PROCESS.

[A communication to the Vienna Photographic Society.]

I HAVE occupied myself almost exclusively for eight years with the carbon process, and have consequently had to work continually with gelatine, without being able to find a suitable filtering apparatus for this colloid. It is, therefore, easy to suppose that I took every possible pains to construct such an apparatus, and my efforts have at last been crowned with satisfactory results. I believe I shall render a service to photographers—especially to those who have to do with gelatine—to apothecaries and chemists, as well as to those manufacturers who have to filter thick fluids, colloids, and grease, by describing my invention.

There are four principal difficulties which beset the filtration of certain bodies—as, for example, gelatine—which are only partially removed by all or any of the apparatus as yet invented. My apparatus removes them completely. These difficulties are—

1. The filter paper soon becomes dirtied, the pores being closed up by the sediment, which is heavier than the fluid to be filtered. I obviate this by causing the pressure of the substance to be filtered to press upwards—that is, to filter from underneath upwards.

2. The filter paper tears under strong pressure. This, however, does not take place when the filter paper is supported on some pervious, but not very pliable, material. For this purpose I have employed, with very good results, the felt which is used in beershops for placing under glasses, and to ensure that no hair shall be carried off from it I enclose the felt in a layer of flannel.

3. Thick substances—such as melted fat, castor oil, syrups, glycerine, solutions of gum, gelatine, and albumen—pass with considerable difficulty through filter paper, and must, therefore, be greatly diluted with water—a proceeding which often carries many inconveniences in its train, especially for photographers who glaze their pictures with gelatine or busy themselves with the carbon process. To remove this difficulty the pressure of the fluid upon the filter paper must be increased; and my apparatus allows of a ten, twenty, thirty, or forty times greater pressure than the ordinary filter, as the height of the pressing column of fluid can be increased at pleasure.

4. Certain oils, fat, wax, bitumen, stearine, &c., as well as gelatine, can only be filtered at such a temperature as shall keep them in a fluid condition. Therefore my apparatus is furnished with an outer covering which may be filled with warm or hot liquid, and in which the required temperature may be maintained, by means of a small spirit or petroleum lamp, up to a temperature of 80° R—as, for example, for the filtration of gelatine. It will be sufficient to fill this outer covering with water, but for a higher temperature oil *should* be used. My apparatus combines in itself all these improvements.

The former consists of two vessels communicating with one another by means of a tube, which is made longer or shorter according as it is requisite for the fluid to be filtered to produce a greater or less pressure. Round the upper edge of the undermost vessel a strong brass ring, two or three centimetres in depth, is soldered. Over this ring comes the filter paper, above which is a round cover of strong felt enclosed in flannel. In order to prevent the liquid to be filtered from finding its way down the sides of the brass ring under the filter paper a strong iron ring is pressed, by means of a screw, against the felt, so that no free space can exist between the ring and filter paper. Besides, in order to prevent the felt from pressing, owing to the weight of the fluid to be filtered upon the filter paper, so as to tear it, a wire netting is placed over it to press back the felt.

This apparatus is quite sufficient for filtration when the fluid does not require to be heated. The fluid to be heated is poured into the upper vessel and passes through the tube into the undermost vessel, passing through the felt and filter paper. In order to be able to collect it over the felt there is an edge above the strong brass ring which forms a receptacle, and is furnished on one side with a waste pipe. If it be necessary to warm the substance to be filtered—as, for example, gelatine—the whole filtering apparatus is enclosed by this outer vessel and a second tube is fastened to the other side, so as to allow the warming fluid to circulate, entering continually by the one tube and leaving by the other. The heat is kept at the same degree during the whole operation by a small lamp. The rapidity of the filtration does not depend solely upon the pressure, but also partially upon the density of the fluid and upon the kind of filter paper.

My apparatus, which I use continually, is scarcely 1·5 metre high, and filters ten litres of solution containing fifteen per cent. of gelatine in two and a-half hours. In large works, where a great deal of filtration has to be done, one upper vessel might be made to feed a number of vessels containing filtrate. The pieces for lengthening out the tubes screw out or in and are removable. To empty both the outer and inner vessels of the apparatus the fluid is removed by means of tubular openings connected with cocks. My apparatus may be obtained of tin with the outer covering of brass from Herren F. A. Wolff and Sohne, the sole manufacturers and patentees. T. Szretter.
—*Photographisches Correspondenz.*

THE TORPEDO AND THE CAMERA AT THE DESTRUCTION OF THE "ROYAL GEORGE."

While the inky billows of midnight were dashing in unbroken succession against either shore of the turbulent Sound (this was on Tuesday night), and the rolling of distant thunder was heard reverberating through the heavens, and the watchful sentinels at Willett's Point Fort were sweetly sleeping behind the parapets, a piratical craft was making her way toward the metropolis, slowly, but none the less surely, gaining here a point and there a point, against the unfavourable wind. None knew of her approach. Lights she had none, and her crew were silent as a Potter's Field grave. Silently she dropped her anchor under the very guns of Fort Schuyler and the Willett's Point Works. There she lay till yesterday morning, making not a sound to arouse the suspicions of the innocent Long Islanders, who were almost within her grasp. When daylight came, and the sun came up over the old woollen factory behind Fort Schuyler, the pirate was first seen from the fort. Men were on her decks and in her rigging, and, although her anchors were down, her sails were up. Her cut was that of a clipper, and she showed every indication of being capable of great speed. Although some of the natives who have some knowledge of the sea insisted that the vessel was a cat-rigged schooner with a leg-of-mutton jib and a cutaway stern, it was soon the almost unanimous opinion that she was a man-of-war in disguise, and this opinion was still further strengthened when it was seen that at her maintopmast floated the dazzling red flag of the Commune. It was expected, of course, by the indignant neighbours that General Abbott, who has charge of the fortifications, would at once open fire on the impudent stranger. Every minute a stunning cannonade was looked for. But no cannonade came. The fort paid no more attention to the vessel than if she had been a tipsy excursion boat from Coney Island. The natives felt deserted. The wolf was at the door, and no friendly gun in the forts would interfere in their behalf. They began to pack up their soft-shell clams and prepare for flight. They changed their minds, however, when General Abbott, accompanied by a number of his officers, all in full uniform, walked down the Government pier at about ten o'clock in the morning, were rowed out to the stranger, sprang upon her deck, and engaged in conversation, apparently, with her crew. The vessel lay about 700 feet from the pier, and she was a mystery that none of the old sea dogs could manage. She had so many queer points. In the first place she had no rudder. Then it was seen that her maintopmast wasn't a topmast at all, but only a slender flag-staff. There seemed, too, to be something the matter with her rigging. Every few minutes a halliard or stay parted, and a sail came rattling down, making an hour's work for some poor fellow to tie the stay up again with strings. Besides, it was soon noticed that the soldiers from the fort were doing all this work, while the pirate's crew kept their places on deck and in the rigging, never moving a muscle. It was clear that the General was in undisputed possession, whereat the Long Islanders rejoiced, because the Long Island household fires were once more safe. When the officers and privates returned to the shore the latter were closely questioned (for the natives have a proper respect for the dark blue cloth, and keep carefully away from it), and they said that the schooner was a fair prize, captured without bloodshed, and that she was to be blown up. A crowd of 200 natives accordingly gathered on the pier immediately (it being then eleven o'clock) to await the blowing up (which was to be at two).

At about noon a number of officers and some ladies went down from the fort, accompanied by about a dozen privates carrying some unknown machinery, which they at once began to put in position at the end of the pier. This machinery consisted of four photographic instruments, a small but very fine scientific clock, an electric battery, and all the machinery necessary for a telegraph office. There were also two small beer kegs, coated outside with pitch, and a large coil of submarine cable. The kegs, each of which contained fifty pounds of powder, were taken out near the vessel in a row-boat, and both sunk—one about twenty feet from the vessel's bow, and the other as far from her stern. They were connected with the cable, the boat got out of the way, and the torpedoes were fired, one at a time, by the simple telegraph key on the pier. Each of them sent a column of water into the air about fifty feet high, which immediately relapsed into nothingness; but no damage was done to the schooner. Then two more torpedoes were sent out and connected with the cable at about the same distances from the schooner as before. These were fired simultaneously, with the same result as to the churning and hoisting the water, but again without injuring the vessel.

It was noticed throughout these experiments, and with great horror on the part of the spectators, that the pirate's crew still remained on the vessel, and that no preparations were made to take them off. How many men might be below decks of course it was impossible to tell, but there were four in sight—one at the wheel, one in the main rigging, one amidships, and one near the bow. These were the same positions as the men were in when the schooner was first seen. Gradually, very gradually, as the tadpole turns into the butterfly, or the caterpillar into the beautiful frog, it dawned upon the Long Island mind that the piratical vessel was the identical old schooner that for a long time had been carrying targets out for the gunners to shoot at; that she had been partially dismantled; that the men on her deck and in her rigging were dummies; and that she was going to be blown up to give a subject for some scientific photographs. The schooner, which was so old that her name had long since disappeared, was christened the "Royal George," (principally by people who had nothing to do with her), and all was ready for the tragedy. The electrical apparatus for taking photographs of moving bodies was put in order. It is as simple as possible. The four photographic instruments were put in line, each pointed at the fated schooner. Over them was a light wooden framework, from which were suspended four light boards, like shingles, so arranged that when they dropped they covered the tube. These were suspended by light cotton threads, which in turn were fastened to light fuses, which connected with the telegraph wires. When the circuit was made the electric spark ignited the fuse, the fuse burned the thread, and in a second or so the board fell before the lens and the negative was made.

The "Royal George" had all her sails hoisted except her jibs. She was to be photographed in the highest style of marine art, sailing along over a deep blue sea. The officers had some idea of saving the sails, and, perhaps, a mast or two, by having them hauled out of the *debris* after the explosion. But when two o'clock arrived a new difficulty had to be encountered. A strong wind was blowing, and this, catching the "Royal George's" spreading sails, had drifted her out of position away from the place arranged for the torpedoes, and far out of the focus of the photographic machines. An officer went out to her with several boat-loads of privates, and by taking her anchor ahead and pulling her up she was gradually put in position again.

"Why don't they hoist her sails, and sail her where they want her?" a spectator inquired.

"Because she ain't got one of them arrangements behind to steer with," replied a soldier, who, no doubt, could discount a sailor on guns, but who didn't quite know the name of a rudder.

The two kegs of powder were fastened to the schooner's bottom, dropping down about three feet. The water was far too deep (about thirty-five feet) to anchor them on the bottom. They were put as near the centre of the ship's bottom as possible, one on each side. The photographic plates for the negatives were kept in one of the buildings as long as possible to protect them from the sunlight, and when all else was ready two soldiers came running down the long, steep hill with the plates under their arms. When the instruments were all ready, General Abbott announced that he would fire the torpedoes. Everybody stood on tiptoe and held his breath. The ladies from the fort looked as anxious as if they were about to see a hanging. Every neck was stretched toward the doomed schooner.

"Hold on," said General Abbott; "wait a minute," and he adjusted something about the keys, and everybody breathed freer again.

"All ready."

General Abbott pressed two fingers upon the key. There was a loud booming noise, seemingly under the vessel, and a little smoke. This was in the first second. Then a great heap of water, about twenty feet high, rose up out of the Sound. This was the second thing seen, and occupied the next second. Then the "Royal George," sixty feet in the air, rising high above the smoke and the water, in ten thousand pieces, each piece a mere splinter, a piece of kindling wood, the pieces revolving and striking against each other in the air. Third, fourth, and fifth seconds. Then a descent of the *débris*, not so rapid as the ascent, the whole mass coming down together with a crash on the water. It makes a little ripple; the smoke dies away; the pieces float away. The "Royal George!" Oh, where is she?

And all this time, which was about the time occupied in winking twice, electricity and the sun had been working together, and had photographed the scene. A hundred small boats flew to the scene of the wreck, and hundreds of the small pieces were picked up for relics. For the four brave mariners who went (up and) down with their ship their bodies are bleaching beneath the waves. It would have puzzled anybody to find a square foot of either sail or masts. General Abbott was fully satisfied with the result, and four excellent negatives were obtained. The General says, however, that the vessel was torn into smaller fragments than he desired; but that it was almost impossible to judge how much powder would be necessary to demolish so shaky a hulk. A hundred pounds of powder, he says, was a very moderate allowance. The photographing was under the immediate charge of Sergeant von Sothen, who has attained great proficiency in the art. This was von Sothen's last work in the army, as his term of enlistment expires this morning, and he expects hereafter to be connected with the Photolithographic Company of this city.—*N. Y. Times.*

[Mr. von Sothen, who photographed these torpedo explosions, informs *Anthony's Bulletin* that in the last torpedo explosion the key of the battery communicated simultaneously with the torpedo and the camera, the subsequent exposures being secured at intervals of half-a-second between each. The time given was from one-sixteenth to one-twentieth of a second, according to the focal length of the lenses used.]

FOREIGN NOTES AND NEWS.

PLOHN'S MATT VARNISH.—CONCLUSION OF HERR VON STEFANOWSKI'S REMARKS ON RETICULATION.—WILDE'S METHOD OF APPLYING ALBUMEN TO GLASS PLATES.

IN the *Photographische Correspondenz* Herr Plohn gives the following formula for a matt varnish which, when poured on the back of the negative, gives it an opal, glass-like appearance and facilitates re-touching by sun or petroleum light, as well as the printing in direct sunlight. The ingredients of the varnish are—

Ether	280	grammes.
Alcohol of 36°	200	,,
Benzine	140	,,
Sandarac	16	,,
Thin, fluid collodion	200	,,

In this month's *Mittheilungen* Herr von Stefanowski's remarks on reticulation of the carbon film are continued. The first part of the present paper treats of the causes of reticulation, and the second part of the means of prevention. The principal cause of this annoyance Herr von Stefanowski takes to be the presence of some foreign fluid or gas between the picture film and the support, and this foreign body, he thinks, is most frequently soluble gelatine.

"Gelatine, especially the lighter sorts, is not only soluble in warm, but also to a certain extent in cold, water; as may be seen by draining off the water in which a quantity of gelatine has been soaked, and then heating the water, to which alcohol is now added, when the water will immediately become white, owing to the alcohol precipitating the gelatine which had been dissolved by the cold water. In the same way, when fastening the exposed carbon tissue upon its temporary or permanent support, a certain quantity of soluble gelatine particles collect in the water under which the transfer is made, and if the water be not frequently changed that quantity is materially increased by the number of prints and the rising temperature of the water.

"These free, soluble gelatine particles collect on the pigmented side of the picture, so that afterwards they are enclosed between the picture and the support. Of course, during the development the parts of the picture where this soluble substance is do not adhere properly to the support, and those parts of the picture film which are thus partly free are expanded by the greater temperature of the water and fall down in reticulated folds. The lighter the gelatine of the carbon tissue the more pictures there are soaked in the same water, and the higher the temperature, especially in summer, of the water used for fixing the picture to the support the more soluble gelatine adheres to the picture film and is squeezed down in a reticulated form. The form taken by a drop of water when squeezed between two glass plates will give a tolerably good general idea of the appearance of reticulation as seen in carbon prints developed upon glass, and will give a pretty convincing proof of the correctness of the foregoing theory.

"As the prints which are latest put upon the support are also generally the last developed I can account in no other way for Dr. Richard's statement—that the pictures last developed most frequently show reticulation—than by supposing that he does not often change the water under which he places the picture on the support, and that therefore it is that water, and not the developing water, which is the cause of his mishap.

"A further cause of reticulation is the rapid drying of the bichromated tissue at too great a heat. Carbon tissues—especially those which only contain sugar instead of glycerine or soap—shrink together, owing to the loss of all moisture, so that when placed upon the support they do not expand to their former size, and a further expansion takes place during development. If the support be also susceptible of expansion—as, for example, in the single transfer—all goes well and there is no reticulation; but the latter frequently appears when the support used is firm and incapable of expansion, and most frequently when uncollodionised plates are used.

"There are two other things which I regard as causes of reticulation. They are:—Alkaline baths, which give the gelatine a tendency to dissolve, and the impurity of the gelatine from which the tissue is made, and which, by organic decomposition, destroys the cohesion of the gelatine molecules, and, as a foreign substance, decreases its adhesive power.

"The last causes of reticulation of the carbon film worthy of mention are the too great solubility of the tissue, induced by too warm developing water, and too long a stay in the washing water or fixing bath; and, lastly, the contracting property of the collodion.

"*Precautions against Reticulation.*—Anything that tends to strengthen the gelatine film may be used as a preservative from reticulation. As one of the best of media I may cite spirits of wine, which is a safe and rapid remedy, either used as a component of the bichromate bath, or as an addition to the water under which the picture is placed on the support.

"The best way, with a view to economy, of using alcohol as a remedy for reticulation is the following:—The bichromated tissue, squeegeed upon a glass plate, should be dipped for two or three minutes in a special vessel containing alcohol, and afterwards hung up to dry.

"The alcohol bath, on the one hand, renders gelatine film firm, and not liable to reticulation; and, on the other hand, it draws out to itself all the moisture of the paper, protects it against organic impurities, and facilitates its rapid drying.

"The drying will generally occupy from half-an-hour to an hour, and it is advisable to sensitise in the early morning all the tissue likely to be required during the day. Then, as the alcohol bath accelerates the spontaneous insolubility of the carbon film, the batch should be developed as soon as possible—at latest on the third day after sensitising.

"As the bichromate salts are perfectly insoluble in alcohol the alcohol bath may be used for a long time; and when at last, by the absorption of water, it has become too weak it may be redistilled. The addition of alcohol to the bicarbonate bath or washing water is not practicable; because as the former must, from time to time, and the latter immediately after use, be thrown away there would be a great loss of alcohol.

"Another preventive measure, especially suitable for very soluble tissue, is not to use it until the third day after being sensitised, when the film will have spontaneously commenced to become insoluble. The slow eight or ten hours drying of the sensitised tissue in an airy room at a low temperature is also of importance in the prevention of reticulation, which generally appears after rapid drying.

"After all has been said it will be seen that the tissue, or, in other words, the gelatine, is the principal originator of reticulation; but the addition of a small quantity of sulphuric acid to the steeping water, the frequent renewal of the same, and the gradual development of the picture, beginning with luke-warm water and increasing the temperature, are good general rules for the operator."

At a recent meeting of the Vienna Photographic Society reference was made to some special preparation of albumen used as a substratum by Herr Wilde. In what the speciality of the preparation consists is not mentioned, but its success probably depends in no small measure on the care with which it is applied, minute directions for which are given, and which would probably be equally applicable to any preparation of albumen:—

The albumen should be filtered before each time of using, so that, besides the stock bottle, an empty one should be kept capable of containing from half-a-kilo to a kilo. Into the mouth of this bottle a glass funnel, lined with a sheet of filter paper, is inserted, and a little of the albumen is filtered into it whenever one wishes to coat plates. For coating an ordinary collodion pouring bottle is the best, and several should be kept for that purpose. In pouring in the albumen do not froth it too much, and wait a few minutes until the froth subsides; then remove any remaining air-bubbles with blotting-paper. The well-washed and dried plates have a little of the albumen spread over one side by means of a soft, elastic brush, after which the albumen is poured over them in the same manner as if it were collodion. If any particles of dust adhere to the plate, or if any air-bubbles remain, then the plate must be cleaned again, and the operation recommenced. The superfluous albumen should be poured off into a bath, and then returned to the stock bottle. The plates are then rested upon blotting-paper, and leaned against the wall to dry; or, better still, they are placed in a plate-rack, where a bath placed under them receives the albumen that drips from the corner.

As the prepared side of the plate is difficult to distinguish from the unprepared side, when the plate is dry a small, white chalk mark may be made at one corner of the prepared side. This mark can easily be wiped off. When prepared in the foregoing way the plates are said to be always ready for use again with merely a superficial polish or rubbing up.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Sept. 26	Liverpool Amateur	Free Library, William Brown-st.
,, 26	Oldham	Hare and Hounds, Yorkshire-st.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE ordinary meetings of this Society were resumed on Thursday, the 12th instant,—Mr. Alfred Brothers, F.R.A.S., President, occupying the chair.

The minutes of the last meeting were read and passed.

The PRESIDENT said that the proposed exhibition had been abandoned in consequence of the small number of exhibits promised.

Mr. D. Young exhibited a lantern carrier, and read a description of it. [See page 449.]

Mr. W. J. Chadwick disputed Mr. Young's claim to originality in the carrier before the meeting. He (Mr. Chadwick) exhibited his back-pressure valve for preventing explosions in lantern practice, and showed some negatives on Swan's plates—all sufficiently dense. One of the negatives represented Mr. Chadwick holding a wax vesta, by the light of which it was taken.

Mr. Coote had again fallen into trouble with his plates, and exhibited some of large size quite spoiled by curious markings.

Mr. Pearson showed some negatives taken on board a steamer.

The Secretary laid the *Bulletin* of the Belgian Photographic Society on the table.

The members then adjourned to the lantern room, where Mr. W. J. Chadwick, with Mr. McCall as spokesman, exhibited a large number of views of Paris, &c., kindly lent by Mr. York for the occasion.

The meeting, which was very largely attended for September, passed the usual complimentary votes, and was then adjourned.

PHOTOGRAPHIC SOCIETY OF FRANCE.

The ordinary monthly meeting of this Society took place on the 2nd ult.,—M. A. Davanne, President of the Council of Administration, occupying the chair. Dr. Hornig, one of the Austrian Commissioners at the Exposition of 1878, and President of the Photographic Society of Vienna, took part in the *séance.*

After the transaction of the usual routine business,

M. Bardy, who fulfilled the duties of secretary in the absence of M. Perrot de Chaumeux, read the following communication from M. Devaux, a chemist, of Gy (Haute-Saône), addressed to the President:—

"I have the honour to make you acquainted with a process I some time ago devised for giving to photo-engravings after nature the grain necessary to the production of the half-tints.

"My process consists in printing simultaneously the grain and the photographic design by interposing between the negative and the sensitive surface a thin transparent granular pellicle. A granular pellicular negative may also be employed.

"The pellicles and negatives are rendered granular by means of an etched impression. Nothing is easier than to obtain the plate necessary to the production of the impression. It suffices to take an electrotype impression from a plate of copper previously covered with a resinous grain, after the manner adopted by engravers in aquatint.

"If the method which I have the honour to lay before you should appear to you to offer any advantage I beg that you will communicate it to the members of the Photographic Society of France."

M. Despaquis observed that it was seven years since he first proposed the interposition of a granular surface to facilitate the production of a grain, and for the retouching of positive proofs.

M. Davanne remarked that it had also been proposed for the same purpose to employ tulle, or net, or any similar material composed of regular meshes.

M. Chevrier, of Châlons-sur-Saône, addressed a pamphlet to the Society, in which he made an appeal to all photographers and persons employing photography with a view of promoting a subscription to raise a statue to the memory of Nicéphore Niepce. The proposal was well received by the Society, and it was resolved to receive subscriptions for the purpose mentioned, and to publish the names of subscribers in the *Bulletin.*

Dr. Hornig stated that a similar subscription made in Vienna had realised 200 francs, and he had pleasure, in the name of his colleagues in Vienna, in opening the subscription list with that amount. The meeting warmly thanked Dr. Hornig for his kindness.

M. E. Lacan, in the name of Capt. Waterhouse, presented to the Society that gentleman's pamphlet on the application of photography to the reproduction of maps and plans, and received the thanks of the members.

The Secretary having read his review of the French and foreign photographic journals, a communication was made by M. Fabre, the Secretary of the Photographic Society of Toulouse, on the subject of emulsion processes. [See page .]

The Chairman remarked that M. Ch. Audra had already pointed out the advantages which appeared to be derived from the preliminary evaporation of the ether and alcohol by pouring the emulsion into a dish and treating it directly with hot water.

M. Franck de Villecholle said that by employing the water too hot a larger proportion of bromide of silver was formed in the granular state, and that he obtained a far better result by not allowing the water to exceed the temperature of 40° C.

M. Balagny also spoke favourably of the preliminary evaporation of the ether and alcohol, stating that he preferred not to employ the addition of quinine to the final emulsion.

M. Mieusement presented to the Society an album containing thirty photographic proofs, forming part of 140 negatives produced by order of the *Commission des Monuments Historiques.*

The Chairman, in thanking M. Mieusement for his presentation, congratulated him on the success of the proofs, observing also that the commission were to be complimented for the course they had followed, in entrusting the work to competent artists instead of trusting to the chance of obtaining in the different localities pictures of various forms and sizes, as had been previously the case. Instead of a collection of pictures differing greatly in quality and size, the commission had now secured the uniformity so desirable in a work of that class; and as the negatives had been bought, and not the prints, all that remained was to see them handed down to posterity in a permanent form and not by the fugitive method of silver printing. He (the Chairman) presented, in the name of M. du Marché, a collection of pictures representing general views as well as the finer architectural details of the church of Brou.

M. Michaud presented a typographic plate of a portrait of the late King Victor Emmanuel, obtained by the processes he had communicated to previous meetings.

Mr. Gurney, of New York, and M. Marc Ferrey, of Rio de Janeiro, also sent specimens of their work.

Mr. W. Harrison read a communication from the Rev. H. J. Palmer on the subject of gelatine emulsions. The substance of this has already appeared in other communications in our columns, so that it is unnecessary to reproduce it here. It deals chiefly with the employment of ox-gall, as proposed by Mr. Palmer some time ago.

The Rev. Mr. Palmer received the thanks of the Society for his communication, and the meeting was then adjourned.

PHOTOGRAPHIC SOCIETY OF VIENNA.

At the last meeting of this Society—the chair being occupied by Herr A. von Melingo in the absence of Dr. Hornig—the first subject discussed was the transmission of collodion cotton.

The President then read the list of the Voigtländer and the Society's prizes, after which

Herr Luckhardt read a communication from Herr Wilde on the subject of his preparation of albumen, which he recommends for overcoming the disadvantages of badly-cleaned plates. Herr Luckhardt was quite convinced that Herr Wilde's preparation was quite different from all the already-known preparations of albumen. [See *Foreign Notes and News*, page 452.] The preparation had no injurious effect upon the collodion or silver bath, and kept well both before and after being poured on the plate, and even increase the sensibility of the film.

Herren Jaffé, Löwy, Ungar, Wrabety, and Dr. Székley each took a bottle of it home to test and report upon its qualities.

Baron T. Szretter showed and explained the use of an apparatus specially adapted for filtering gelatine for the carbon process. [See page .]

Herr Luckhardt then exhibited Dr. Stein's apparatus for photographing the curves of the pulse and the voice, as well as some very successful glass negatives of pulse and sound curves.

Baron Schwarz demonstrated several multiplying processes, which, though not directly connected with photography, were regarded with great interest by the meeting.

The so-called "Schmittdruck" was exhibited, as well as Baner and Co.'s process.

An Edison's electric needle was next shown; after which,

Herr Luckhardt called attention to the large photographs sent to the Paris Exhibition by Herr Victor Angerer. The size of one was one metre by eighty centimetres. As it was then rather late, it was resolved to postpone the opening of the question-box until the next meeting, and the meeting was then adjourned.

Correspondence.

DETERIORATION OF ALBUMENISED PAPER.

To the Editors.

Gentlemen,—I enclose a piece of non-sensitised albumenised paper, half of which—that marked with a cross—has been exposed in a south window for about a week. On close examination you will see that the exposed portion has assumed a slightly yellow colour.

Does not this show why silver and carbon prints grow yellow with age? It is not because they are *photographs* that they fade, but because they are made of paper. I am now exposing a piece of paper made by Messrs. Marion and Co., and hope in a short time to send you the result.—I am, yours, &c., A. A. Campbell Swinton.

Kimmerghame Dunse, N.B., September 7th, 1878.

P.S.—Some years ago I remarked how notices written on writing paper have become yellow after having been pasted on notice boards in a room to which sunlight had access.

[The specimen enclosed is one of the most marked cases of rapid fading by the action of light that has yet been submitted to us.—Eds]

DRYING PRINTS.

To the Editors.

Gentlemen,—After reading the article on print drying in your last issue, I feel tempted to describe the system I use as being more simple and, I think, better than any one you have mentioned in that article. If you think I am wrong I bow to your superior knowledge. However, I give it to you for what it is worth.

My plan consists in having two sheets of very stout millboard large enough to lay the sheet of paper upon, and two sheets of good tin of the same size. After the prints have been well washed, take one sheet of millboard, upon it lay out a sheet of tin, on that lay a sheet of blotting-paper, and upon that lay the prints on top of each other, all with their faces upwards; and upon the last one another sheet of blotting-paper, the other sheet of tin, and then the other millboard. Now pass the batch endways through a clothes wringing-machine, and you can put any amount of pressure on, as it will not harm the prints, nor press them out of shape.

After passing them right through twice (not backwards and forwards) I have always found them dry enough to be placed between sheets of tissue paper until they are wanted for mounting, or they are dry enough to be trimmed and mounted at once after pressure. The prints strip from one another with the greatest ease.

Sheets of paper that have been very much covered with blisters in the washing water have come out all right when treated in this manner; but when I have dried such sheets by hanging them up I have found the albumen surface to peel off. I have placed as many as sixty pieces of paper after washing one on top of the other, and never had a print spoiled or torn by the above treatment.—I am, yours, &c.,

25, *Williamson-street, Liverpool,* RICHARD CROWE.
Sept. 17, 1878.

EXCHANGE COLUMN.

I will exchange a Ross's $8\frac{1}{2} \times 6\frac{1}{2}$ doublet, folding camera for same, tripod, Howard's tent, and sundries, for a gentleman's gold watch, or offers other than photographic apparatus.—Address, D. W. J., care of Mr. Edge, Llandudno.

ANSWERS TO CORRESPONDENTS.

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

W. A. B.—After sensitising rinse the paper in distilled water, and it will keep good for several weeks.

B. O. T —A leather bellows body for a camera may be obtained from any of the principal London camera manufacturers.

W. A. M.—The patent for inserting a piece of coloured paper in the lens cap need not excite your emotions, seeing that it has lapsed several months ago.

E. S. B.—All requisite information respecting the time for sending in pictures for the forthcoming exhibition will be found in a paragraph in the present number of the Journal.

D. F. S.—There is no photographic exchange club which, so far as we know, exists at present. But it will not be difficult for you to effect an exchange with some photographic friend.

JOHN BERINGER.—We have never tried the preparation of that kind of varnish, hence cannot give the information required. Respecting the production of enlargements, see our last ALMANAC.

X. Y. Z.—The copyright has still three years to run; but we have authority to state that by addressing a note to the person named permission to copy the photograph will be given you with great readiness.

L. J. (Manchester).—The lighting is of too uniform a character, and it is to this that the flatness of the face is owing. Erect a dark-coloured screen on the left side and you will see what a great improvement in the modelling of the face will have been effected.

S. MURRAY SMITH.—Certainly; carbonate of soda may be employed in alkaline development. If you had been an attentive reader of this Journal you would have ascertained that this discovery was made long antecedent to your first experiments in alkaline development.

J. K. NIGHT.—By the adoption of obvious precautions such stains in the prints would never occur. *Never* touch, or allow anyone in your employment to touch, a sheet of albumenised paper after hyposulphite of soda has been handled, until by carefully washing the hands they are known to be scrupulously clean.

M. A. (Oxon).—While there are several passages in Shakespeare which, taken verbally and isolated from the context, are capable of being construed photographically, we are not aware of any which quite resembles the idea you express. The nearest approximation to it, of which we are aware, is—"Drawn by the powerful sun."

TYRO.—1. It is evident that decomposition has set in. The brown matter deposited is evidently gold, and it will be more satisfactory and less expensive to make a new toning-bath than to waste gold in an attempt to resuscitate the old one.—2. The address given in the advertisement will prove quite sufficient, the advertiser being well known in that locality.

GEORGE BEATTIE.—While we are unable to indicate what you designate the "very best" formula for practising the dusting-on process, we are happily in a position to give one that has been thoroughly tried and has given great satisfaction:—

Dextrine	1 ounce.
Grape sugar	1 „
Bichromate of potash	1 „
Water	1 pint.

Of course the quantities here given may be reduced to any extent, provided the relative proportions are retained.

JOSEPH L. HILL.—Under certain circumstances it is both judicious and necessary to raise the temperature of the silver bath even to nearly the boiling point, such as when it gets charged with alcohol and ether; but, as a rule, it will work in the most satisfactory manner when its temperature is similar to that of a warm, genial atmosphere, or from (say) 60° to 65° Fahr.

W. KNOWLES.—1. Modify the proceeding by adding the acetic acid to the albumen and, after stirring well and allowing a little time to elapse, then adding the water. We have never known of failure to result in the preparation of this mixture.—2. The proper kind of rubber is a fine black sample, which may be ordered through any dealer in india-rubber goods—3. Give it a gentle boil, and add alcohol to make up for evaporation.

X. Y. Z. (Perth).—1. The defective markings on the negative are far more likely to be due to the collodion than to the silver bath. Obtain a sample of rather old and red-coloured collodion, and try again. Should the markings still appear, try the effect of dissolving a little soluble cotton in the collodion so as to impart to it greater body without increasing the proportion of iodides. Should you still experience non-success write again.—2. The solution mentioned is intended for use as a lubricant to the surface of the mounted picture previous to applying friction by means of a heated polished steel burnisher.

J. A. P. BAKER.—Of all kinds of stereoscope yet introduced for examining paper pictures the very worst is that in which the picture is illuminated through a small aperture in front. It is bad, for one reason, because the side light thus thrown upon the photograph shows the texture. The best form is that in which there are no sides or front, thus allowing the light to fall from every direction. It will be remembered that when we described the American stereoscope, several years ago, we laid special stress upon that feature. Let it be understood that these remarks have reference only to slides printed upon paper, and not to transparencies.

RECEIVED.—*Autotype Notes*; Major Gubbin; J. Owen; and W. G. Helsby. Registrations in our next.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.

THE FORTHCOMING PHOTOGRAPHIC EXHIBITION.—We wish to call the attention of our readers to considerable alterations that have been made in the rules for sending pictures to the Photographic Exhibition, which will open next month at 5A, Pall Mall East. In former years pictures were sent direct to the Gallery, but this year all cases are to be addressed to the "Photographic Society of Great Britain, care of Mr. J. Bourlet, 17, Nassau-street, Middlesex Hospital, London, W." However, pictures delivered by hand, and not in cases, will be received at the Gallery on Friday and Saturday, September 27th and 28th. These are the last days on which pictures will be received at either address. For further particulars application should be made to Mr. E. Cocking, the Assistant Secretary of the Society, 57, Queen's-road, Peckham, S.E.

AN INTERNATIONAL PHOTOGRAPHIC ALBUM.—Photography has found many applications of late, and the practical use made of it by the police is not the least important. In connection with the appalling catastrophe on the Thames the camera did much to assist in the identification of the bodies; and there are still photographic records in the hands of the police which, together with the particulars of clothing found upon the drowned, will doubtless lead in the end to clear up all doubts in connection with this lamentable affair. The London police now make it a rule to secure a photograph of all bodies found, and copies are sent to stations all over the country, where people having missing friends may see the pictures. In Paris, the assistance that photography may lend in judicial matters is recognised even more fully, and there is a photographic staff at the *Rue de Jerusalem*, presided over by two skilled operators, who enjoy the rank of inspectors of police. In Berlin, again, especially since the attacks upon the Emperor, the chief of the police, Herr von Madai, has made great use of photography in the registry of criminals. Herr von Madai has suggested that there should be international records of criminals kept by the aid of photography, and in order to start the project has furnished the European capitals with an album containing portraits of all the chief delinquents in Prussia. In this country, as our readers are well aware, we also make it a practice to photograph all criminals; the county gaols send up to Scotland Yard copies of their photographs, while governors make an exchange of collections among themselves. As it is, the portraits of our own malefactors make up a vast series, and, if criminal photography is to become an international industry, we shall want a special library to contain the results. In the meantime, there can be little doubt that the system of keeping portraits of prisoners in this way must exert a salutary check upon crime.—*Observer*.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 960. Vol. XXV.—SEPTEMBER 27, 1878.

NEW IMPROVEMENTS IN PLATINOTYPE PRINTING.

As would have been seen from the transactions of the recent meeting of the British Association, the platinum printing process of Mr. William Willis, Jun., which was described three years ago in The British Journal of Photography, has been subjected to further modifications, the alterations that have been made having the important effect of greatly simplifying this process. Previous to describing the details of the improved method—which were not given in the paper read before the British Association—we shall first present an outline of the process as formerly practised, with an account of the chemical changes produced.

A sheet of smooth and plain paper having been partially excited by being floated for a short time upon a three-grain solution of nitrate of silver was, after being dried, washed over with a mixture of ferric oxalate and chloro-platinite of potassium, which, having been poured upon the surface, was distributed by means of a pad of cotton wool. The paper, sensitised in this manner, was afterwards dried and exposed to light in the printing-frame, the exposure given being only one-sixth of that which would have been required to produce an image upon silvered albumenised paper. When withdrawn from the pressure-frame the paper was immersed for a few seconds in a solution of potassic oxalate, followed by similar treatment—first, in a weak bath of solution of oxalic acid, then in a sulphocyanide of gold toning bath, and, lastly, in hyposulphite of soda followed by water.

In the improved method of carrying platinotype printing into effect the preliminary wash of nitrate of silver has been entirely dispensed with. There were two reasons for its adoption:—One was that through the agency of the subsequent toning bath a warm tint might pervade the finished picture. Another was that when it was made use of the image was found to be more thoroughly attached to the paper—sunk, as it were, in its meshes—than was the case when no such argentic treatment was had recourse to. *Why* it exerted such an influence upon the deposition of the platinum was never very well understood. Nevertheless the fact remained as has been stated. The withdrawal of the silver as an element in the preparation of the paper was of course attended by the simultaneous withdrawal of the sulphocyanide of gold toning bath, and also that of the hyposulphite of soda, neither of which existed save as adjuncts to the primary employment of the silver. The chemistry of the silver, the toning, and the fixing may, therefore, be expressed as follows:—The platinum image (of the formation of which we have not yet spoken) was of a black colour; conventionalism demanded that all photographs be warm; a little silver, followed by warm toning, gave a sop to conventionalism; and hyposulphite of soda was the fitting wind-up to the employment of the silver. But all this has been changed.

We shall now describe the process as we saw it carried out on the occasion of a visit we paid last week to the laboratory and *ateliers* of Mr. Willis.

A sheet of plain paper—plain in the sense of its having neither been albumenised, silvered, nor salted in any way—was laid down upon a large slab of glass, which was placed in a horizontal position. By convenient clips the paper was secured at the corners. The windows of the room, we may premise, were fitted with yellow blinds. A small quantity of a sensitising fluid was poured upon the centre of the paper and spread over its surface. The sensitising fluid was composed of—

Ferric oxalate	60 grains.
Potassic chloro-platinite	15 „
Plumbic chloride	2 „
Water	1 ounce.

Why the lead salt in the above formula has been imported into the process we are not absolutely certain, unless it be that it helps to give the image, produced at a subsequent stage, a stronger hold of the paper than would be the case were it omitted. At anyrate it seems to fill the place of the now discarded nitrate of silver in an effective manner. This solution is spread over the surface of the paper by means of a flannel squeegee, formed by bending the fabric over a piece of india-rubber tubing placed upon the edge of a slip of plate glass. The paper is now hung up to dry, and as soon as all surface moisture has disappeared the drying is finished before a stove or fire. The paper is now ready for exposure under a negative; it may either be used immediately or it may be kept until it is convenient to expose it, for it possesses excellent keeping properties. Prints have been obtained a month after the preparation of the paper, the quality of these being such as to indicate no difference whatever between them and prints upon paper freshly prepared. This is a valuable feature, and one which photographers will not be slow in appreciating.

The exposure under the negative is about one-third of that required in the case of albumenised silvered paper; in other words, it possesses three times more sensitiveness than ordinary albumenised paper. Although a *visible* image is produced by the action of light, it is found that the duration of exposure is more easily determined by an actinometer than by the inspection of the image. It may be recollected that in the account we gave of the original process three years ago we stated the sensitiveness to be five times greater than that of albumenised silver paper. This was the case; but the increased sensitiveness was owing to the presence of silver on the paper, and as this material is not now used the diminution of the sensitiveness is thus accounted for. However, as we have seen, it is still much more sensitive than ordinary silvered paper.

While the paper keeps well previous to being printed upon, it also keeps for a considerable period afterwards, or previous to development. The time of the operator may, therefore, be wholly bestowed during the day upon the printing, reserving the development till the light has diminished to too great a degree to enable the printing to be continued.

To develope the image a bath must have been prepared in the following proportions:—

Potassic oxalate	120 grains.
Potassic chloro-platinite	7 „
Water	1 ounce.

This solution is placed in an enamelled iron dish, and strongly heated by means of a Bunsen gas burner placed underneath. Previous to immersing a print in this solution let us inquire what change has taken place in the paper by the exposure to light, so as to ascertain the functions of the developing solution.

The paper, it will be remembered, was coated with a solution of fer*ric* oxalate combined with a solution of potassic chloro-platinite. Now, the former exerts no action whatever upon the latter; but upon being exposed to light it is converted into fer*rous* oxalate, which is a reducing agent for platinum. When, after exposure to light in the printing-frame, the picture is examined it is feebly though distinctly visible, although up to this stage the platinum has not taken any part in the performance. The visible picture is composed of ferrous oxalate, and it would have been equally visible had no platinum been present.

We have now to consider in what manner the ferrous oxalate, which has been formed by the light, is made to act as a reducing agent for the platinum. Before it can do so it must first be in solution, as no chemical action takes place between two bodies unless one of them be in a liquid form. So far as we know there is only one solvent for ferrous oxalate, namely, potassic oxalate; hence the print is drawn over or brought into contact with a solution of this salt, the result being an instantaneous reduction of the platinum with which the ferrous oxalate was in immediate contact. Up to the instant when the potassic oxalate is applied the atoms of the two agents are side by side in the paper, the ferrous oxalate being held in check, so that it is incapable of reducing the platinum until it is itself first acted upon by a solvent. No sooner, therefore, is the print placed in contact with such a solvent—in this case potassic oxalate—than the solution, simultaneous with its formation, attacks and reduces the platinum salts with which it formerly reposed harmlessly. The image is thus formed of metallic platinum—or "platina black," as we have sometimes heard it designated—which is well known to be one of the most stable substances in nature.

As far as the image itself is concerned the print is now finished; but in order to get rid of the salts in the paper it is washed for about five minutes in a bath containing a very small quantity of oxalic acid and a few drops of nitric acid. Subsequent immersion in about three changes of plain water, taking altogether about half an hour, completes the operation.

Prints produced by the process described are exceedingly durable. They have been subjected to several tests, which, if applied to silver prints, would have proved destructive. Among these tests are nitric, hydrochloric, sulphuric, sulphurous, and hydrosulphuric acids; the alkalies; bichloride of mercury; hyposulphite of soda; cyanide of potassium; sulphide of ammonium, and others, none of which exert the slightest action on the print.

Those who are familiar with the details of the earlier method adopted by Mr. Willis, Jun., will not fail to see in what respects this indefatigable experimentalist has improved this valuable method of printing, which has a most important future before it in other directions than in the production of prints upon paper.

THE INTENSIFICATION OF NEGATIVES IN HALF-TONE WITH BROMIDE OF COPPER.

Amongst many useful things connected with photography which scarcely secure the amount of patronage they deserve may be ranked the method of intensification which was saved from oblivion by Mr. L. Warnerke and Captain Abney. Unearthed by the former gentleman from some out-of-the-way corner where it had long flourished unseen, the formula was brought into prominence in an article *On a Neglected Method of Intensification*, by Captain Abney, who also described in a scientific manner the *rationale* of its working. Based, in the first instance, upon the bleaching of the developed image by means of a solution of bromide of copper, this plan differs from others of a similar character thus far—in that the increase of density is gained by the employment of a plain solution of nitrate of silver, and the additional strength is, therefore, entirely due to silver and not to the substitution of any new metal.

When utilised to its fullest extent the accession of density is so great as almost to unfit it for subjects in half-tone, though, by modifying the process slightly and proceeding with due caution, satisfactory results may sometimes be attained in cases which would prove hopeless under any other mode of treatment. But, by giving a little study to the pecularity of the change brought about in the nature of the image, it is possible to produce a variety of results under special circumstances, and we have found the capabilities of the process considerably extended. According to Captain Abney's analysis of the reaction performed, the darkened image produced by the application of a solution of nitrate of silver to the "bleached" film consists of a mixture of bromide and sub-bromide of silver, the metal of the sub-bromide being drawn from the solution. As a subsequent treatment with alkaline pyro. or ferrous oxalate reduces the whole of the image to the metallic state, we thus obtain a most intense deposit, consisting of the original quantity of silver *plus* that extracted from the solution employed in darkening it.

The addition of metal thus brought about differs entirely from that arising from the ordinary method cf silver intensification, inasmuch as the latter is deposited entirely on the surface of the film, with comparatively little discrimination between lights and half-tones. In the other case, however, it is formed in the film by chemical means, and bears a strict proportion to the quantity of metal already present to form the different grades of the picture. Practically, then, the only limit to the density obtainable rests on the capability of the collodion film of containing or holding the metal, added by successive operations without busting or splitting. It is not probable, however, that, except in the case of a very weak negative, the necessity will ever arise for a second application of the treatment, but, rather, it will be desirable to modify the excessive action in the case of negatives in half-tone.

The simplest means of reducing the excessive density consists, as we have previously shown, in decreasing the strength of the silver solution. If a solution be used of the strength of sixty or one hundred grains to the ounce, as first recommended by Captain Abney, the darkening of the image is so rapid and complete that the result is only capable of being utilised for subjects devoid of half-tone, and even then the transparent portion of the negative must be absolutely free from the slightest trace of deposit to start with. But by considerably reducing the strength of the silver the action is very much slower and to a great extent under control, and, as the colour of the deposit is of a highly non-actinic character, it is possible to stay it when it is judged that the density is sufficient without allowing the full reduction to take place. We are unable to speak as to the stability or otherwise of each of the images, which, it must be remembered, are composed partly of bromide of silver, and not metallic silver as in ordinary cases. The darkening which we might be led to expect under the action of light, slight though it may be, would no doubt prove injurious in a half-tone subject, though perfectly harmless in a negative on black and white; for, if the latter has unsuccessfully withstood the searching test of the previous operations, there will be no deposit in the lines to darken or fill up.

This uncertainty is, however, removed in the method we are about to describe, and which is put forward only for a special purpose and not for general work, as its effect is far too pronounced. Most of our readers who have experimented to any extent with rapid emulsions will have discovered that it is a matter of the greatest ease to obtain a preparation which, while possessing extreme sensitiveness and the capability of rendering the feeblest details, is quite beyond the power of all ordinary methods of intensification. The image produced is remarkably clean and delicate, and will stand any degree of intensification in reason *without fogging*, but appears to be wholly devoid of some element essential to the production of density. With plates prepared from such an emulsion we have succeeded, by means of bromide of copper, in producing negatives of full printing density combined with perfect gradations of light and shade, and equal in every respect to the ordinary standard of alkaline-developed plates. It is scarcely necessary to say that the original image must possess (however feeble it may be) the basis upon which to build up the picture. A plate showing transparent glass where there should be detail will be perfectly useless.

The solutions required are as follow:—The bromide of copper solution is prepared by mixing equivalent parts of sulphate of copper and bromide of potassium (in hot saturated solutions), and after the mixture has stood for an hour or two it is decanted or filtered off from the sediment, and diluted to the required strength. A working solution of the right strength may be made by dissolving thirty grains of sulphate of copper in one ounce of hot water, and then adding an equal quantity of bromide of potassium, but as this rapidly becomes too weak it is preferable to keep the strong solution and dilute it when required. The nitrate of silver solution should be of the strength of from ten to twenty grains to the ounce, according to circumstances, and must be neutral or very slightly alkaline, as the presence of free acid appears to interfere with the reduction. In addition to these we require ordinary alkaline pyro. or ferrous oxalate of full strength.

After fixing and well washing the plate, it is flooded with the bromide solution for a longer or shorter time according to the increase of density required. If the image be extremely thin the bleaching action may be complete, but it must be borne in mind that this will lead to such an accession of strength as few instances will require, and if once overdone the case can scarcely be remedied. We prefer to proceed by only partially bleaching the image by flooding the plate with the solution, and allowing it to remain until a certain change is seen to be produced upon the surface colour, and then, after a very thorough washing, to apply the silver nitrate, allowing it to act until it produces no further darkening. At this stage of the operation a tolerably accurate idea may be formed of the ultimate result; in many cases the density will now be sufficient, but the image will be liable to the suspicion of instability, and the same may be said if the further degree of strength necessary is attained by only a partial reduction with *weak* alkaline pyro. or ferrous oxalate.

Experience alone will enable the operator to judge how far to carry the bleaching action and what strength of silver to use, but these should be adjusted so as to allow the full action of a strong developer subsequently. It is far better to err on the side of a too short application of the bromide or a too weak solution of silver, as if the first result be insufficient it can be repeated, the only point of importance to be observed being the thorough washing of the film between the different operations. The process may seem a roundabout and troublesome one on paper, involving, as it does, three separate stages, but it is not really so in practice, and, moreover, it is only recommended as a *dernier ressort* when all else fails. It has proved the means in one case of rendering available a considerable quantity of emulsion otherwise useless, but from which we are now able to produce most satisfactory results. The colour of the negative is a rich warm brown, and the printing qualities excellent.

In operating upon films which have been dried the bromide solution will be found to act very slowly and irregularly, unless special precautions be adopted to reopen the pores of the collodion. Moistening with dilute alcohol proves insufficient. It is necessary to use it warm and of full strength; that is to say, undiluted methylated spirit. Finally: we recommend that the image be not exposed to light (even unprotected gaslight) after bleaching, as this seems to lead to irregularity, though in what manner we are not now prepared to say. Insufficient washing, though it may not actually produce stains, has a similar effect.

PAPER FOR CARBON PRINTING.

The value of uniformity is nowhere seen to greater advantage than in photography. Photographers use glass plates for their negatives, printing-frames for holding them, carriers for the dark slide, mounts, matts, frames, and a hundred other articles of apparatus and fittings of one uniform regular size, with the effect of being able to purchase them at a fraction of the price that would be necessary in the case of a single instrument or piece of apparatus made specially. Anyone may soon see the force of our remarks if he has to get made any article of however trivial a kind, which is at all "out of the usual rut." He will have to wait a very long time for it, and when he has obtained it he will most likely be astonished at its cost, though there may really be no overcharge whatever.

It is the same with our chemicals. We can buy the usual dark room supply at reasonable prices and with great ease; but the moment we want any variation all kinds of difficulties are placed in our way. If we require a sample of gun-cotton of any special character we must, practically, make it ourselves.

And so it is with the fabric which forms the basis of ninety-nine per cent. of all the photographs in existence—the paper—whether albumenised or gelatinised. Thus, for albumenised paper we are practically limited to two sorts—one manufactured in France and the other in Germany. We are aware that the limited choice is owing to the fact of the papers we specify being of particular excellence; but their peculiarities have been sought out, and the chief element of value—the sizing—analysed, and the paper generally examined, till we know exactly how to make it. More than that: manufacturers in England have been asked to produce a similar product, but in vain. They know their business, and they know that to make a special article would involve more outlay and trouble than would be compensated for by any possible profit.

With carbon printing we shall, without care, drift in the same groove; thus at present there is in the market little, if any, kind of paper beyond a smooth sort of hard texture, faced, as it may be termed, with either shellac or gelatine and chrome alum, the proportions of the latter varying according to the purpose required—single or double transfer. Let anyone visit any exhibition of importance and note the water-colour pictures exhibited there. He will find every variety of surface and texture of paper, from the smoothest hot-pressed to the rough-surfaced, coarse-looking material apparently more adapted for making packing bags than anything else. On the other hand, let a visit be taken to the next Photographic Exhibition, and what a contrast! Thanks to the better art education that now obtains we get plenty of artistic excellence but an excessive similarity of texture. Boldness of lighting, accompanied by the veriest nauseating smoothness of surface and miniature-like delicacy of effect, and all in the same material so far as surface texture is concerned.

And yet this need not be, in carbon in particular; for it lends itself with particular ease to a far greater variety and pliability of treatment than silver printing, owing, in one direction, to the ease with which considerable alterations may be made by careful use of hot water. Our readers will say that they cannot purchase anything but the smooth kind of prepared paper that we speak of. We know they cannot, and that is the reason of our writing as we do; but it is a matter of the greatest ease to prepare their own paper, and, being independent of the manufacturers to that extent, their pictures will have the more originality and consequent value if technically good.

We shall be understood as not desiring to support any further variety in the manufacture of the paper itself, but only the adoption into general practice of a greater number of the existing varieties, as we know is done in a few isolated cases.

Thus, let us take a life-size head vignetted. What can look more effeminate than such a picture put on smooth, single transfer paper, no matter how white it may be by the addition of barytes to the gelatine? But print the same negative on to a piece of Whatman's paper (say), and it at once becomes an artistic production—all the better for needing little or no aid from the retoucher—and, if a few touches are deftly put in with black chalk and a stump, we have a highly-telling work of real merit. This is only one of many cases; we do not suggest life-size heads as forming the *ultima thule* of effort in this direction. Smaller heads may be placed on paper not so coarse, but still far removed from glossy tameness. Landscapes offer special scope for such treatment, and yet while we have a return to the textures given by the old waxed-paper negatives recommended we have no reference to any but the accustomed support, which might seem almost to be part and parcel of photography.

For those who are unaccustomed to the use of textured paper every information could be obtained from a respectable artists' colourman, who would be the most likely person at present from whom to obtain any necessary variety.

There is a quality sold more than any other made by the well-known manufacturers, Messrs. Whatman, and it is always called at the stationers' and artists' colourmen "Whatman's drawing-paper." It is made of various thicknesses, classified as of so many pounds to the ream, and can be obtained either hot pressed, not hot pressed, and extra rough. The hot pressed is only suitable for smaller work from the smooth surface the hot pressing gives, a good portion, however, of which disappears after wetting. The purchaser should be careful, if desiring to use large pieces, to ask for the seamless. It is a little dearer, but is free from a permanent crease across its breadth which disfigures the other kind.

These would be enough to start with, and afterwards the photographer wanting still more variety could try the various kinds of Hollingworth's paper, the tinted paper, and the imitation Creswick paper, &c. The real old Creswick paper is considered so valuable that we knew of a "find" of half-a-ream in a country stationer's shop being discovered by an artist, who bought it all up cheap and sold it at several shillings per sheet. Of course such paper would not have any more value than new paper for photographic use. When experiments with tinted paper are made we would caution our readers to employ not the "machine-made" but the "hand-made" paper, the former being too woolly or rotten to withstand the necessary handling in hot water.

THE LATE THOMAS GRUBB, F.R.S.

At the mature age of seventy-eight years, Mr. Thomas Grubb, F.R.S., died at his residence, Rathmines, Dublin, on the 19th instant.

It is now over twenty-three years since Mr. Grubb appeared in a prominent manner before the photographic world. The late Mr. Sutton had written in advocacy of landscape lenses of small dimensions, which elicited a masterly rejoinder from Mr. Grubb, whose acumen as an optician was thereby immediately recognised. At this time Mr. Grubb was Honorary Secretary of the Dublin Photographic Society (of which he was the founder), as well as the editor of its journal, which was soon afterwards discontinued.

Several papers of the highest importance in photographic optics were afterwards published by Mr. Grubb, among these being the following:—*On the Properties of Landscape Lenses; On Lunar Photography; On Some of the Optical Principles Involved in the Construction of Photographic Lenses; On a Screw Adjustment for Stereoscopic Lenses; On Proposed Standard Rules for the Dimensions of Lenses; On the Value of a Stop to a View Lens; On the Angular Field of a Lens; On the Effects Produced by Enlarging the Aperture of the Photographic Lens; On the Aplanatic Lens; On Comparative Trials of Photographic Lenses; On Lenses of Rock Crystal; On the Optical Centre; On the Equivalent Focus of Photographic Lenses, and on the Angle of Subjects Included; On Displacement and Distortion; On Intensity and Quickness of Lenses; A Simple Method of Ascertaining the Equivalent Focus of a Photographic Compound; On the Equalisation of the Photographic Image in Fields of Large Angle Projected upon a Flat Surface;* and *On the Relative Transparency to Actinic Rays of Glass and other Media.*

These are the titles of the leading communications on optical subjects made to the public, either through the instrumentality of the photographic societies of London and Dublin, or of THE BRITISH JOURNAL OF PHOTOGRAPHY and other channels. Such communications were not, however, exclusively confined to optical topics, for among other contributions to photographic literature we find one—*On a Large-sized Portable Camera, and Stand for the Same*, together with another, which we believe was the last he wrote, entitled—*A Camera for Dry-Plate Work.*

The invention of his "aplanatic" lens, in 1858, gave an impetus to the perfecting of landscape and group lenses; nor must we omit mentioning his services to the magic lantern by the invention, several years ago, of an achromatic condenser for that instrument, by means of which a wide angle of light may be condensed to a point sufficiently small to serve for illuminating a microscopic object. Mr. Grubb was also the inventor of the ingenious system of lens supports made use of by Lord Rosse in supporting his mirrors.

Notwithstanding Mr. Grubb's great talents as an optician we do not know how far we can strictly speak of him as one by *profession.* It is quite true that he created what has since developed into very large and important optical works; but several years ago, owing to his genius as a mechanician, he received the appointment of Engineer to the Bank of Ireland, when the optical business he had created we had occasion to speak only a few weeks ago, by whom the business has been exclusively conducted during the past ten years.

Originally intended for the mercantile profession, the mechanical tastes of the late Mr. Grubb were too strong to allow him to continue as he began; accordingly he threw himself with ardour into the higher departments of mechanics and optics, producing both refracting and reflecting astronomical telescopes of great magnitude and world-wide renown, the great Melbourne telescope being among the last executed under his own personal supervision. Mr. Grubb also invented and manufactured magnetic instruments which were supplied to more than forty British stations. When in Dublin a few weeks ago, attending the meeting of the British Association, we, along with many others, were permitted to see in operation, at the Bank of Ireland, the wonderful machinery invented by Mr. Grubb for printing bank notes from steel plates, the machinery for engraving these plates and for renovating them when worn, together with the machine by which they are numbered, and which is of such an automatic nature as to resent any omission of routine duty on the part of the attendants by refusing to proceed with its work until all manual requirements have been complied with.

Of the optical establishment at Rathmines we shall say nothing at present, reserving our remarks for a subsequent article, in which we propose embodying some further notes we made during our recent visit to Ireland.

Mr. Grubb was a man of a singularly kind and unobtrusive disposition, and was much beloved by all who enjoyed the pleasure of his acquaintance. Although he had been confined to his bed for a considerable time previous to his death, he retained his intense love for mechanical pursuits to the very last. A swing bench had been devised and erected so as to turn over his bed, and here he had his vice and other tools. Often after working for hours would he be seen to have fallen asleep with the tools in his hand, as in the act of filing or adjusting some piece of mechanism. He died "in harness." Thus has passed away another of those veterans to whom photography has been so much indebted.

THE question has often been raised as to the possibililty of dispensing with the spirit varnish, now ordinarily used as a protection to the negative, and substituting for it some other medium affording equal security without the inconveniences which attend the present system. A few months ago there was a rumour that we were shortly to have a new varnish possessing all the good qualities and none of the bad ones of the best varnishes now in use, with the additional advantage that it required no heat for its application; but, whether the promised boon is to be made public or not, there can be no doubt that varnishing the negative forms one of the minor troubles of the photographer. With a large choice of materials ready to hand it is somewhat surprising that so few really good varnishes are in the market, or that those which are obtainable are not of a more uniform quality, for it is no uncommon occurrence upon opening a new bottle of varnish of a "brand" which has worked admirably for a length of time, to find that the fresh sample is entirely different from what has gone before. Whatever may be the reason of this want of uniformity, it is certain that a large body of photographers would welcome anything which came in the shape of an efficient substitute, and, pending the arrival of that desirable consummation, several we know have seriously taken into consideration the possibility or advisability of making use of such makeshifts as albumen, gelatine, gum arabic, *et hoc genus.* We are scarcely inclined to counsel the adoption of such substitutes as the permanent protection of the negative, though they may, especially the first, answer well enough for temporary purposes. All are easily attacked by damp or moisture, which is a deadly foe to the permanency of negatives even when protected by a resinous varnish, and must be much more so when the protective coating is itself liable to decomposition, to say nothing of the danger arising from a piece of damp paper becoming permanently fixed to the negative during printing. But in cases where only one or two prints are required from a negative, or where it is desired to test its soon afterwards passed into the hands of his son, the present eminent optician of that name, concerning whose factory and large telescopes printing qualities previous to varnishing, a temporary coating of gum or albumen forms a sufficient protection, and obviates the trouble which would arise from the ordinary negative varnish. Albumen, however, though forming an admirable protecting film, is not so well adapted for use in the case of negatives which may require re-intensification, as it does not appear to soak into the pores of the film sufficiently, or, if it do, its subsequent removal is a matter of some difficulty even with a strongly-alkaline solution. Gum arabic is easy of removal and leaves the film in a sufficiently porous condition, but it is easily scratched and liable to crack in drying, while gelatine is open to the charge of raising blisters. We have recently tried a temporary coating, recommended by a friend, which answers admirably, combining the hardness of the albumen film with the ease of removal of gum. It consists of the white of one egg with sixty grains of dextrine in five ounces of water, mixed *secundum artem*, and filtered; it is poured on the wet collodion film, allowed to soak for a minute, then drained and dried. No alcohol should be used in remoistening.

PARIS INTERNATIONAL EXHIBITION.

In addition to the list of medal awards which we published last week we have received from our Paris correspondent the following

Supplementary List of Awards.

Gold Medal.—Howard Grubb.

Bronze Medals.—Alfred S. Fisk, W. H. Wheeler, — Unwins.

Honourable Mention.—Adolphe Beau, Godbold and Basebe, Lemere and Co., Lombardi and Co., W. F. Maltby, Carl Norman and Co., Herbert Watkins, Matthew Whiting.

To the photographic exhibitors of the United States of America the following awards have been made:—

Gold Medal.—N. Sarony.

Silver Medals.—Continental Photographic Company, F. Gutekunst, — Lundy, Joshua Smith (Chicago).

Bronze Medals.—Thomas Gubelman (Jersey City), — Guerin (St. Louis), Lafayette Seavey.

Honourable Mention.—J. H. Beal (New York), E. Gurney (New York).

NOTES FROM THE NORTH.

For the past six months the north, so far at least as I have been concerned, has been left to look after itself; but the readers of The British Journal of Photography have not lost much, as nothing of great interest seems to have occurred, except, perhaps, the discovery by Mr. J. G. Tunny of the tendency of certain samples of transfer paper to darken on exposure to light, and that has received, and is still receiving, a satisfactory share of attention.

In the early part of this year I mentioned in these *Notes* the fact that, notwithstanding the dulness of trade, several new photographic establishments were to be opened in and around Edinburgh, and as I recently had an opportunity of spending some time in one of the most important of them a brief account of the visit may not be without interest.

It is well known, in this part of the country at least, that a good many of the "well-to-do" Glasgow folks take up their abode in the picturesque and beautiful homes on the banks of the Clyde, and that many more are in the habit of spending the summer months "doon the water." In consequence of this the various towns along the river banks, and for some distance inland, offer such a fair field for the professional photographer as to have attracted some of the best and most successful men in the kingdom, and there is probably no better work done in any part of the country than on the banks of the Clyde.

Of those photographers one of the best known and most successful, both from an art and a commercial point of view, is Mr. McKenzie, late of Paisley. Anxious, probably, to enjoy the advantages of a residence in or near the Scottish metropolis, and having faith in the fact that good work will attract good customers to almost any locality, instead of selecting a situation in a fashionable thoroughfare—where at the best he would have been cramped for room, and where his patrons would have had probably several stairs to climb—he looked about for a suitable place in the country but within an easy drive of the city. This he was fortunate enough to find in "Willow Bank," which happened then to be in the market, and, both in itself and its surroundings, is one of the most lovely places within a five-mile circuit of Edinburgh.

Willow Bank lies on the northern slope of Arthur's Seat, about two miles from the city, and consists of a fine commodious mansion house, surrounded by a beautifully-kept garden and finely-wooded grounds. Mr. McKenzie's original intention was to have occupied a part of the house as a private residence, but, like most of those who took to the art in its early days, he is evidently an enthusiast in it, and, I think wisely, came to the conclusion that for the proper enjoyment of domestic life it is desirable that the studio and the dark room should be separated as far as convenient from the home. Acting on this conviction he has taken up his abode in another suburb of the city, distant at least five miles from Willow Bank, and, as that place is therefore altogether devoted to photography, it affords probably the most magnificent suite of reception and dressing rooms to be found in any establishment in the kingdom.

Mr. McKenzie's faith in his work is not only shown in having selected a place at a considerable distance from town, but also in the fact that it does not obtrude itself on public sight. It must be looked for by those who want it, as it is not even on one of the main roads that lead to or from the city, but on a kind of side road—what in England would be called a lane—going from Piershill toll to the Portobello and Duddington road, and on which the traffic is of the most limited description. Entering the grounds by one of two gates that open on this road, the visitor is led by a winding carriage drive to the principal entrance, where a flight of a few steps leads into the hall, and the eye is at once attracted by several paintings by one of Mr. McKenzie's sons, which give promise of no mean power in that direction. To the right and left respectively are what were the drawing and dining-rooms of the mansion, but now converted into noble-looking reception and waiting-rooms, and containing many beautiful art objects and some exquisite specimens of photography.

I do not know whether the feeling is general, but with me it is almost always present on entering the receptions rooms of most photographers—that they altogether overdo the exhibition of specimens. As a rule they are littered everywhere—from floor to ceiling, on tables and in cases, and occasionally strewed about the floor as well. There is hardly a vacant spot on which the eye can rest, and, even where the specimens are all of high-class work, the mind can with difficulty carry away an impression of any one picture in particular, and is more likely to retain only a confused jumble of what has passed before it. Mr. McKenzie has wisely avoided this, and places before his visitors one or two albums and about a couple of dozens of his cabinet portraits, all of which may be not only seen but carefully studied during the short time usually devoted to such employment; and the specimens thus shown are well worth studying, whether by those who love to look at high-class work for its own sake and for the pleasure it gives them, or those who are anxious to decide as to the style in which they themselves should be taken, or by those photographers who are willing to be students, and on the outlook for such inspiration as shall guide them in their striving after perfection.

A hasty survey of Mr. McKenzie's pictures conveys the idea that he is strongly "Rembrandtish" in his style, but a more careful examination shows qualities attained by few who aim at that class of effects. The high lights and deep shadows are there, and pretty much in the proportions seen in the best specimens of so-called "Rembrandt" work; but the lights are nowhere obtrusive, the shadows are full of most exquisite detail, and the two are so gradually and delicately blended as to produce a harmony that I do not think could be obtained except by the peculiar method of lighting which he employs.

The entrance to the studio is through the window of the north reception-room, and is reached by a flight of maroon-covered steps. It is about twenty-five feet square, seven feet from the floor to the "easing," and ridge roofed for about two-thirds from the wall against which it is built. The rest of the roof and south end is octagonal in form, or rather like the half of an octagonal building. It is glazed down to the floor with corrugated glass of a slightly-greenish tint, and utterly destitute of curtains, blinds, or shades of any kind; in fact, a casual observer would come to the conclusion that the designer of the studio had set before himself the problem of how closely he could imitate the conditions of open-air portraiture, and had succeeded admirably. In a studio of such a form of course the sitter may be placed in almost any part of it, and Mr. McKenzie says that perhaps the most beautiful effects are got in full sunlight, the angles of the corrugated glass so effectually breaking up the direct rays as to give them the character of simply a flood of diffused light.

At the time of my visit the sitter was placed equidistant between the north and south ends of the studio, and about six feet from the east side. The background, fitted with castors, was maroon, stretched on a frame about eight feet square and faced west by north, and, preconceived notions regarding the necessity for shade overhead and blinds notwithstanding, the effect was simply perfect.

A door out of this studio led into another of about the same size, with lop-sided ridge roof standing east and west, and glazed with plain glass. It was divided into two equal parts by a north and south partition so as to make two small studios to be used for children or rapid exposures, and, like the principal one, had neither blinds nor shades.

The system of lighting that I have tried to indicate may be more general than I think, but, if not, it is well worthy of a fair trial, as the negatives I saw in the printing-frames at Willow Bank were as perfect as anything could well be, and that without any aid from the art of the retoucher, beyond the mere stopping out of mechanica blemishes, The printing department is altogether separate from the other branches. The former proprietor of the place had been fond of hunting, and built an extensive kennel about fifty yards from the house. This has been fitted up with a series of washing troughs, sensitising, toning, and fixing apparatus, and a portion of the exercising court covered with glass, under which printing may be done on rainy days. Altogether the establishment is fitted up in a most substantial and convenient way, and is capable of affording accommodation for a very large business. At present the printing is confined to silver, but Mr. McKenzie intends shortly to adopt carbon printing also, and, as such enterprise as he has shown deserves a fair reward, I hope to see Willow Bank become one of the photographic institutions of Scotland.

John Nicol, Ph.D.

PHYSICS IN PHOTOGRAPHY.*

We must suppose that we have at hand a perfect emulsion, a film of which will give a bright image on development after exposure in the camera. Let half-a-dozen plates be prepared with such an emulsion by simply flowing it over glass plates and allowing the films to dry; and then let these be exposed in the camera for the time necessary to give a strong image on development. Let the plates be immersed respectively after exposure in a weak solution of nitric acid, of potassium permanganate, potassium bichromate, nitrous acid, hydroxyl, iodine or bromine vapour, or be exposed to the action of ozone, it will be found that the image impressed by light will steadily refuse to develope, however much it may be exposed; or, again, if another half-dozen plates be prepared and be exposed to light external to the camera, we know if exposed to the lenticular image after such treatment that we might obtain an image on development, but that it would be obliterated by the veil induced by the preliminary exposure. If between the preliminary exposure and exposure in the camera the plates be treated with any of the above solutions or vapours, and be then washed, we should find the impressions of light in the camera would yield images perfectly free from the veil. In other words the treatment of the film with any of these solutions will destroy the effect of the action of light. Now, as we have already shown, the image is formed of silver sub-bromide; hence we may say that the treatment has changed the sub-bromide to an undevelopable compound. When exposed to iodine or bromine the sub-salt will naturally become converted into the primitive salt; but when we look at the nature of the other destructives we cannot but be struck with the fact that they are either solvents of metallic silver or oxidising agents. In the first case we may presume that the loose atom of the silver of the sub-bromide (Ag_2Br) is dissolved away and converted into some other form of silver, leaving behind the half molecule of bromide, and in the other we may presume that the sub-bromide is oxidised to form an oxy-bromide of silver.

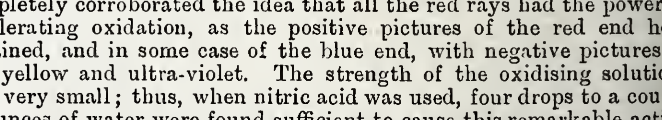
With this fact as a starting-point it appeared probable that the elimination of a veil due to an emulsion ought to be effected by the same agents as if the veil occurred through the action of light. It was well known that, in order to get an emulsion perfectly free from this enemy, chlorine, bromine, iodine, or some diad chloride or bromide were necessary to be added to the washed emulsion if the silver nitrate was in excess at first, and that nitric acid had the same effect if added to the emulsion with the silver nitrate. Here, then, seemed to be the roof of what was wanted; but another link was still required to make the reasoning complete. In making an emulsion, if the soluble bromide was in excess none of these agencies were required. The question then arose as to why this was the case. To clear this up a fair hypothesis was taken, viz., that no soluble bromide was absolutely free from contamination. If the bromide were of the alkalies, or some of the metals such as zinc, it was probably contaminated with the oxide, whilst with other diad metals it was probably of the lower form of bromide. Thus, cupric bromide was probably contaminated with cuprous, and cobaltic with the cobaltous, though in infinitesimally small quantities. Now the former impurity would cause the formation of silver oxide, and the latter of silver sub-bromide (argentous bromide). Experiment showed that the former would act as a nucleus on which the metallic silver, reduced by development, would be deposited, whilst the latter would have the same composition as the latent image, and thus induce the objectionable veil. The same reasoning applied to the chlorides, but the whole explanation was still incomplete. Experiment showed, however, that the order of formation of the different compounds of silver was as follows:—Argentic bromide formed first, next argentic chloride, then argentous bromide and chloride, and finally the oxide. If, then, there was but little of the impurity present in the soluble bromide used in forming the emulsion, pure silver bromide would alone be formed, leaving the impurity in solution, and in a state to be washed out. The whole subject of the fog-giving properties of emulsion was thus cleared up, and the correction necessary for it was apparent.

All practical photographers are aware that in the ordinary dry-plate processes there is a deterioration of the image if plates be kept a long time before exposure and development, and if sufficiently long time elapse that the image will almost refuse to develope at all. The question arises why this obliteration of a developable photographic image takes place. We have seen how an image can be destroyed artificially by the use of oxidising agents, and we might naturally infer that the same destructive agency might obliterate the image even when the oxidising agent is merely ordinary air, and after considerable experimental proof we are compelled to come to the conclusion that this is the case, more especially when it is found that any readily-oxidisible matter, such as gallic acid, if applied in solution and dried in contact with the sensitive film, preserves the image for a longer period than if this precaution be omitted. The oxidisable matter has to be oxidised before the image itself is attacked, for we may assume that the image itself is not as readily oxidisable as such bodies as that mentioned, and many others. The fact that the image can be oxidised and thus destroyed, seems to disprove the once-held opinion that the undeveloped image was formed of metallic silver—a body which will tarnish but not oxidise, the pure oxides being unstable.

As a sequence to the destruction of the photographic image by oxidation, the hitherto unexplained results which Draper obtained when photographing the spectrum were examined. Briefly it may be stated he found that if a spectrum was allowed to fall on a sensitised daguerreotype plate which had received a preliminary exposure to white light a remarkable phenomenon took place—a phenomenon which was also observable if weak white light were allowed to fall on the plate during its exposure to the solar spectrum. In developing such an image with mercury vapour, the blue, or most refrangible, end of the spectrum was impressed in the usual way—that is to say, the Fraunhofer lines showed as dark lines on a lighter background. At the red or least refrangible end of the spectrum, however, the Fraunhofer lines were seen as light on a darker background; in other words, the photographic action was reversed, the neutral point of no action lying somewhere in the yellow. On studying a picture taken by this means it was observed that in all cases the darkest Fraunhofer lines had the same tint, and that effect of light lines upon a dark background, or dark lines upon a light background, were caused by alteration in tint of the background itself. Could this effect have anything to do with the oxidation? If it had it would indicate that the rays in the least refrangible end of the spectrum must *accelerate oxidation*: for it must be remembered that the plates had received an exposure to white light either before or during exposure to the spectrum, and that the red rays prevented the development of the effect of the white light.

Now Draper had failed to get the same result on films of collodion containing the sensitive silver compounds, though he had obtained the reversal of the least refrangible end of the spectrum on such plates. If the theory of oxidation held good for daguerreotype plates it ought also to hold good for the collodion films, and experiment decided once again in favour of the theory. Collodion films, which held *in situ* the blue form of silver bromide already alluded to, and which had been proved to be sensitive to the red end of the spectrum in the ordinary sense of the word (*i.e.*, that a proper negative picture of it could be obtained as it could of the blue end), were the subjects of experiment. It is evident, if the red rays were accelerators of oxidation, that in order to get a positive picture of the red end (*i.e.*, one answering to the reversal of the Fraunhofer lines in Draper's daguerreotype plates) the films should be exposed to the spectrum whilst in some oxidising medium, weak enough by itself, not totally to obliterate during the time of exposure to the spectrum any preliminary exposure which should be given to them, and yet strong enough to do so, and to destroy the reducing action of the red rays, if these latter possessed a power of accelerating oxidation. Ozone, hydroxyl, nitric acid, and other oxidising agents completely corroborated the idea that all the red rays had the power of accelerating oxidation, as the positive pictures of the red end here obtained, and in some case of the blue end, with negative pictures of the yellow and ultra-violet. The strength of the oxidising solutions was very small; thus, when nitric acid was used, four drops to a couple of ounces of water were found sufficient to cause this remarkable action to take place, whilst if the nitric acid was reduced in quantity, or omitted altogether, the effect of the ordinary negative picture was obtained in that part of the spectrum (*figs.* 3 and 4). On the other hand, when the strength was increased, the image disappeared altogether.

FIG. 3.



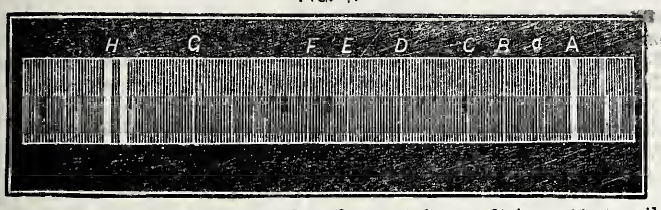
Figs. 3 and 4 show the results indicated above; the shaded portions show where the spectrum was photographed in the usual way, and the white portions indicate where the reversed action took place.

We are not sure but we believe that Draper used silver iodide as his sensitive salt in the experiments with collodion, in which he failed to obtain these phenomena. The iodide is insensitive to the red end of the spectrum under ordinary conditions of exposure, being usually exposed in the presence of a solution of silver nitrate which clings to it after taking it out of the bath. It was found, however, if this free

* Continued from page 140.

silver nitrate were washed away, and if the exposure to the spectrum took place in the oxidising medium, after a preliminary exposure to white light, that this reversing action, as it is called, of the red end of

FIG. 4.



the spectrum was obtained; and under certain conditions, if the silver nitrate were removed, that the same results could be obtained even when the plate was not exposed in this oxidising medium.

Now regarding the reversal in the blue indicated above, how can it be accounted for? By the very same theory, only an abandonment of the hypothesis that the least refrangible end of the spectrum *alone* is an accelerator of oxidation becomes necessary. In all comparative experiments made with the daguerreotype plate and the collodion film the difference of these conditions must be remembered. In the former the halogen liberated by the action of the light on the iodide combines immediately with the metallic plate, forming fresh sensitive compound; in the latter the thickness of the sensitive compound has a limit, and much of it is altogether inoperative, the outside of the particles alone being available for the reducing action of light, and the halogen has to escape or be absorbed as best it may. In a collodion film it is manifest that the reduction of all the sensitive compound available must take place after a time, and when this is the case, if the same rays which effect reduction likewise accelerate oxidation, that the latter effect of the rays will have unimpeded action. So much for the theory. Does experiment prove or disprove it? It is evident, if the hypothesis be correct, that a film which is exposed to the action of light in a medium free from oxygen, or in one which is an absorbent of oxygen, should be incapable, on development, of showing this reversal of the ordinary action of light.

The results again showed that the theory was borne out, for it was found impossible to obtain a reversal of the image when so exposed. Here, then, we have a probable explanation of the phenomenon known as solarisation, to which allusion has already been made; it seems to be an oxidation of the undeveloped image.

—*Nature*. W. DE WIVELSIE ABNEY.

(To be continued.)

THE REACTIONS OF CHROMIC ACID AND CHROMATES UPON SUBSTANCES OF ORGANIC ORIGIN, CONSIDERED WITH REFERENCE TO THEIR USES IN PHOTOGRAPHY.*

It is generally sufficient to hang up the paper or glass coated with bichromated gelatine to dry spontaneously in a dark room or in a well-ventilated box, where they will be protected from the light. It is easily understood that the time required for drying depends principally upon the amount of water held by the air. When the pressure of moisture is slight and the atmosphere is far from being saturated the gelatine dries rapidly; when the opposite is the case it remains moist for a long time. In order to obtain positive data as to the influence of moisture in the atmosphere I made a long series of observations with an August's psychrometer. The psychrometer, as you are doubtless aware, consists of two thermometers divided into tenths, one of which has a wet bulb and the other a dry bulb[1]. From the difference of temperature registered by these two thermometers one can calculate the absolute degree of moisture contained in the air; that is to say, from the continuous evaporation of the water as well as the relative moisture, which shows the maximum percentage of water vapour contained in the atmosphere at that particular time and temperature[2].

The less moisture contained in the air the more rapid the evaporation; but if the air contain a great quantity of moisture it is often not advisable to dry bichromated gelatine in it (as may be ascertained by watching the psychrometer), as the drying would proceed too slowly. I found that the temperature of the air of the drying-room should not sink lower than from about 20° to 25° [the temperature given here applies more particularly to lichtdruck and galvanoplastic plates; carbon tissue dries more readily, and for it the temperature may with advantage be lowered to 15° C.], and that the difference between the readings of the wet and the dry bulbs should not be less than 5° or 6° C. The moisture contained in the air will then represent some 45 to 55 per cent., and the pressure will be equal to from 8·0 to 15·7 millemetres; while in winter, in consequence of the low temperature of the air, the moisture contents of the atmosphere are small, the dry air being warmed when the room is heated is relatively much drier, and accelerates evaporation much more rapidly than an equally warm summer atmosphere usually does. Thus it is that the drying of gelatine films in a room is undertaken under much more favourable circumstances in winter than in summer—a statement which at first sight seems scarcely believable, but which is nevertheless perfectly correct. The use and constant observation of a hygrometer in the drying-room would seem from the foregoing to be no useless "fad," even were the computation of the moisture contained in the air found to be at first a work of difficulty. In our drying-room an August's psychrometer has a permanent place and is in constant use. More convenient but much less exact are the *hair-hygrometers*, about which one may learn by consulting Kämtz[1] or Schübler[2]. In the drying-room one of these hair-hygrometers should never indicate more than 60° to 70°.

* Continued from page 426.

[1] Poggendorff's *Annalen*, vol. v., pp. 69 and 325; vol. xiv., p. 137.

[2] Suhl's tables are very convenient. They appeared in *Jelinek's Anleitung zur Anstellung Meteorologitcher Beobachtungen*. Vienna, 1869.

I have mentioned that under certain atmospheric conditions the required quick drying of the bichromated gelatine may proceed in free air. When in consequence of being loaded with moisture the atmospheric conditions are unfavourable, and when one cannot remedy matters, as in winter, by heating, one must have recourse to artificial means; the need for this occurs much more frequently in summer than in winter. The superfluous moisture must then be abstracted from the air by chemical means. For this purpose calcic chloride is especially worthy of recommendation, and has been used by Swan,[3] Scamoni,[4] Woodbury,[5] and Despaquis[6] for drying bichromated gelatine, the latter being placed in a tightly-closed vessel the bottom of which is strewn with *calcic chloride*. When in time, owing to the quantity of moisture it has absorbed, the salt has completely melted it may always be renovated by heating and evaporation, and in this it offers an advantage over the equally-effective drying medium, *sulphuric acid*,[7] which has also been recommended for use in photography.[8]

In this way the gelatine dries rapidly (the thicker films in about twenty-four hours) without losing its solubility in hot water. Swan[9] has, indeed, observed that bichromated gelatine dried over chloride of calcium sometimes becomes insoluble; but this must surely be of rare occurrence. I at least have never remarked it, except in so far as that the film does not remain long moist. The counsel to use *burnt lime*[10] for drying is not to be commended, owing to the slowness of its action.

Artificial methods of drying are almost exclusively used for thick bichromated gelatine films, mostly those upon glass, such as photo. relief druck, and, above all, photogalvanoplastic plates. Lichtdruck plates, on account of the granulation required, may, with advantage, be dried at a higher temperature. Carbon tissue, which is sensitised by floating upon a potassium bichromate solution, dries very quickly when hung up in free air, so that the formerly-recommended[11] drying over calcic chloride may be dispensed with in this case.

Instead of drawing the moisture from the air of the drying-room at an ordinary temperature, and by that means hastening the drying, it is open to one to increase greatly the temperature of a special oven. This is a very useful expedient and less costly than the calcium chloride. In many cases, however, it is not permissible to raise the temperature above the melting-point of the swollen gelatine (as, for example, carbon tissues, the gelatine of which would run); in other cases (lichtdruck, &c.) it can without injury be raised to the melting-point of the gelatine and kept there until the film be quite dry, though even here the temperature should not be too high, because the bichromated gelatine generally remains exposed to it for hours before becoming dry.

The temperature of the drying oven should never rise higher than 60° C. Here, again, I must repeat the warning that those bichromated gelatines which must absolutely retain the whole of their solubility in hot water during the process of developing the picture demand careful treatment and a lower temperature when drying—somewhere about 40° C.; while lichtdruck plates can even be dried at 70° C.[12]. To make matters sure one would be safe to get a temperature between 50° and 60°; the films would then require from three to ten hours to dry perfectly. At from 25° to 30° C. some sixteen to twenty hours are required; at 70° C. they are ready in from one to two hours. Of course these numbers vary with the thickness of the films on the glass plates. It is worthy of remark that the gelatine films when quickly dried can withstand great mechanical pressure, while slowly-dried

[1] *Vorlesungen über Meteorologie*, 1840, p. 100.

[2] *Grundsätze der Meteorologie*, 1849, p. 59.

[3] *Photographische Correspondenz*, vol. v., p. 45.

[4] *Handbuch der Heliographie*, 1872, p. 77.

[5] *Photographische Correspondenz*, vol. iii., p. 13; *Archiv*, vol. xvi., p. 159.

[6] *Photographisches Archiv*, vol. vii., p. 244.

[7] For many purposes it may be used even when it has absorbed a good deal of moisture.

[8] Leth, *Photographische Correspondenz*, vol. viii., p. 182; Despaquis, *Photographisches Archiv*, vol. vii., p. 244; Werden, *Idena*, vol. xii., p. 186.

[9] *Photographische Mittheilungen*, vol. iv, p. 207.

[10] Swan. *Photographisches Archiv*, vol. viii., p. 45.

[11] *Photographisches Archiv*, vol. viii. pp. 45 and 246. Swan.

[12] The bichromated gelatine film of photogalvanoplastic plates is, as is well known, thicker than that of lichtdruck plates, and should, according to Leipold, be always dried at a higher temperature. Too great heat induces the formation of stripes across the plates.

plates are soft and friable.[1] Too quick drying causes bands to form across the plate, which show later when the pictures are printed.[2] The quickly-dried films have a matt surface, while the slowly-dried ones are glossy.

The opinions of photographers seem to be pretty unanimous on this point. Scamoni[3] dries his heliographic plates and Vidal[4] his lichtdruck plates at 30° to 31° C.; Abney[5] dries heliotype films at 24° C.; Pretsch[6] photogalvanographic plates at 36° C.; and Geymet[7] at 40° to 60° C. Courten[8] dries lichtdruck plates at 55° to 65° C. Husnik[9] gives more exact directions for lichtdruck plates, for he says—"At a temperature of from 35° to 38° C. lichtdruck plates do not get a sufficient grain. The best temperature is about 55° C.; 65° C. is too high, as the film then becomes insoluble."[10] Albert,[11] Markl,[12] and Voigt[13] all dry their lichtdruck films at about 50° C. The temperatures of 75° C. given by Reich,[14] and 100° C. given by Towler,[15] for drying lichtdruck plates is decidedly too high. The bichromated gelatine might easily be thereby rendered partly insoluble.

In the attempt to dry quickly one should not choose too high a temperature. Rapid drying at a low temperature are the conditions after which one ought to strive. While the one requirement so far limits the other, it must be remembered that it can only do so to a certain degree, which cannot be overstepped with impunity. J. M. EDER, M.D.

(To be continued.)

MILITARY BALLOONING.

THE matter of ballooning for military purposes appears to be once more attracting attention in this country. In France they have now a properly-organised service under the command of a colonel of the National Engineers, who considers all novelties and proposals as they arise, and who sees, moreover, that the state has always a body of skilled aëronauts at its disposal. At the end of the Paris siege the postal department, it may be remembered, possessed a large number of balloons, and these, being handed over to the French war minister, constituted the *matériel* necessary in the formation of a military balloon service. Colonel Laussedat—whose name as an energetic officer of the French Topographical Department is well known—was placed in command, and he at once secured the services of one of the Messrs. Goddard to put the whole of the apparatus in a fit condition for service. Since that day ballooning in France has been considered as much a duty of the engineers of the army as telegraphing and surveying, and classes both for officers and men are held for instruction. Lately, by the resignation of Colonel Laussedat, the French balloon service has lost its chief support; but his place has just been supplied by General Farr, who will, no doubt, take measures to maintain the high efficiency which has been attained by his predecessor.

In France, as in this country, the balloon is chiefly regarded by military men as an important means of reconnoitering. The Paris photographer and aëronaut, Nadar, was successful on several occasions in securing photographic records from balloons, but he never published his *modus operandi;* and the problem of balloon photography is one which still excites a good deal of attention. Mr. Walter Woodbury, the well-known inventor of Woodburytype—the only practical photo-engraving process we know—submitted, during the last war, to the Russian government a very ingenious method of securing pictures at an altitude. By his plan no one ascends with the balloon at all, and therefore the latter may be of very limited dimensions. It is captive, and twisted into the tethering rope are insulated wires in connection with the camera. The camera is weighted and hung upon a pivot so as to be always horizontal, and a fan attached to the balloon prevents the same from gyrating. It is easy to understand how a lens may be capped and uncapped from below with the aid of an electric current, and the photographs are secured—for a series may be taken at one ascent—upon a length of sensitive tissue which is unrolled for use through the medium of clockwork. The sensitive tissue and roller arrangement is that of Mr. Warnerke, which is known to all dry-plate workers, and which permits of securing pictures without glass. Mr. Woodbury's invention has, so far, been tested only in respect to its photographic properties; but in cases where an aëronaut would run too much risk, or where a large supply of gas is not available, the apparatus would be well worthy of trial.

It is the difficulty of securing a sufficiency of gas for inflation that at present stands in the way of employing balloons in the field. The French balloons are all large ones, for they were constructed most of them for postal service during the siege, and, besides the mails and aëronaut, sometimes carried three passengers. With the exception of half-a-dozen, all the balloons which left Paris had a uniform capacity of 2,000 cubic metres, while one, in which M. de Fonvielle and three other persons travelled from Paris to Louvain, measured 3,000 metres. Such bulky balloons as these are unsuited for the field, where the problem is to send a single observer aloft with the minimum amount of time and trouble. The smallest balloon and the lightest gas for the purpose are what the soldier seems to require, and it is towards these two points that attention has lately been directed by Captain Templar and the other officers who are just now occupied in the study of aërial navigation in this country. Naturally enough, hydrogen holds out the most promising features as a lifting medium, and it is with this gas that experiments are once more to be made. As our readers remember, the weight of hydrogen is calculated to be 2·14 grains per 100 cubic inches, while air, on the other hand, weighs thirty-one grains; and, as the lifting power is represented by the difference between these numbers, it stands to reason that theoretically a balloon, if filled with hydrogen, need be of but comparatively very small dimensions. Unfortunately, in a practical affair like ballooning, a lot of accidental matters require to be taken into consideration, and two of these are the facts that it is difficult to secure pure hydrogen, and more difficult still to keep it in the balloon envelope when secured. Captain Templar is sanguine that a 10,000 cubic feet balloon is quite capable of lifting an observer high enough for reconnoitering purposes, if filled with hydrogen, and wellnigh proved his case the other day when he overcame gravity, if he did not rise, with the aid of a light coal gas with which this small balloon was filled. The coal gas, specially manufactured for his balloon, had a lifting power of fifty pounds per thousand feet, so that a total of 500 pounds was here at his disposal. As we have said, this was insufficient for an ascent, for besides the weight of the aëronaut there are, it must be remembered, envelope, car, tackle, cable, and ballast to be taken into consideration. Instead of 500 pounds, hydrogen of the same volume would have supplied a lifting power of 700 pounds, and this, of course, would have been ample and to spare for an ascent.

To make this hydrogen recourse will be had, as in previous experiments undertaken by our military authorities, to the decomposition of water in the form of steam. The latter is to be passed through tubes filled with iron filings or turnings, and these, in becoming oxidised, set free the hydrogen. Unfortunately the hydrogen obtained in this way is impregnated with moisture, and unless submitted to the action of some desiccating agent like quicklime, for instance, is of little good for ballooning. The hydrogen it is proposed to obtain in the field, at anyrate, in this fashion, and it remains to be proved whether Captain Templar and his colleagues can secure it sufficiently pure and in proper quantity under these practical conditions. Although hydrogen is given off fast enough at the onset, previous experimenters have found the supply to fall off rapidly, for as soon as the surface of the particles becomes oxidised the decomposition of the steam ceases.

But perhaps the most interesting feature of the present ballooning experiment will be the trial of compressed gas. As our readers know very well, compressed gases are now a commercial article in this country, and you may purchase cylinders of oxygen or hydrogen at twenty atmospheres pressure. As our Royal Engineers carry about with them in the field such unwieldy things as pontoons they can hardly grumble at a wagon load of hydrogen tubes, and with these it is suggested to fill a balloon just wherever a reconnaissance is to be made. On nearing the enemy the first convenient spot will be chosen for the manufacture of the hydrogen, and this will then be compressed, with the assistance of suitable apparatus, into the tubes, to be drawn off again when the ascent is to be made. In this way there is always to be gas at hand, not only to fill the balloon but to keep up a constant supply for a limited period, since hydrogen, under the most favourable circumstances, rapidly exudes from a balloon envelope.

A military balloon, it appears to be decided, must be a captive one, and opportunity would of course be taken to place the observer in electrical communication with the earth through the medium of insulated wires twisted round the rope in the same way as in Mr. Woodbury's photo.-aërial apparatus above described. H. BADEN PRITCHARD.
—*Nature.*

HOW TO SIT FOR YOUR PORTRAIT.

THIS is the title of a thoroughly-practical sheet of instructions to intending sitters with which we are favoured by Mr. F. W. Bannister, of Manchester, who has prepared the same for the benefit of his own clients. Mr. Bannister has very kindly allowed us to reproduce it for the use of our professional readers, to some of whom it may at least afford a hint:—

At the Show Room.—It is impossible that the artist can attend here. All business matters must be settled with the bookkeeper only. Give

[1] Werden, *Photographisches Archiv*, vol. xii., p. 185. Leth, *Photographische Correspondenz*, vol. ix., p. 182.

[2] Geymet, *Photographisches Archiv*, vol. xiv., p. 112.

[3] *Handbuch der Heliographie*, 1872, p. 33. He also dries his lichtdruck plates at 45° to 56° C., and his gelatinised negatives for drawing off at from 24° to 30° C.

[4] *Photographie au Charbon.* Vidal, 1877, p. 81.

[5] *Photographisches Archiv*, vol. xvii., p. 54.

[6] *Photographische Correspondenz*, vol. ii., p. 153.

[7] *Photographisches Archiv*, vol. xiv., p. 113.

[8] *Photographische Mittheilungen*, vol. xiv., p. 61.

[9] *Gesammt-gebiet des Lichtdrucks*, 1877, p. 55.

[10] Lemling, *Photographische Correspondenz*, vol. xiv., p. 193.

[11] Markl, *Phototypie*, 1870, p. 39.

[12] *Phototypie*, 1870, p. 39.

[13] *Photographische Monatsblätter*, Frankfurt, vol. i., p. 47.

[14] *Photographische Correspondenz*, vol. x., p. 122.

[15] Dingler's *Polytechnic Journal*, vol. ccvi., p. 203.

all orders carefully, clearly, and decisively, so that alterations may not be required in the studio; and, if doubtful on this point, see the book-keeper again, who will give all information as to when ready, how sent by post or otherwise. Be particular in giving accurate name and address, as we are not responsible for loss by post. Here select the size, style, or kind of portrait required, or if you prefer any particular view of your face, or to match any other portrait, so that you may be ready for the

Dressing Room.—Arrange your toilet and dress carefully, and if your face be much freckled or rough apply a little violet powder, and slightly pencil your eyebrows if very light. Be not prejudiced against any position that you may have had badly taken elsewhere, it might be the only good pose of your face when properly lighted and artistically taken. Promises of unbounded patronage if well taken will make no difference in the production; the artist takes *all* and *every portrait* to the very best of his ability, which is to his own as well as to your interest. Have no feeling of mistrust on this point, because it is very likely to give a bad expression. Good-mannered people need not be told to treat the artist with becoming respect and confidence, and with attention to his instructions, nor find fault with his necessary apparatus; by so doing, sitting for your likeness will be a pleasure instead of a trying and disagreeable ordeal. Throw cares, troubles, anxieties, and business aside, and be on the best terms with yourself.

The Studio.—No one except the sitter can be admitted. It takes many years of anxious study to do what accompanists suppose they can do in a minute, but a very little interference may make it impossible to do afterwards, viz., pose the figure. Here the artist cannot attend to any other business except likeness-taking. Here he will give you every instruction to carry out your wishes in producing the kind of portrait you have previously fixed upon, as far as the art of portraiture and science of photography and its appliances will permit of. He may have to alter considerably from the exact position, to secure the best form and most artistic portrait, and will advise you for the best. It is too late to make changes or alterations after the pose has been fixed upon. Be ready for the prepared plate, as it will not keep very long. Be not annoyed if spoken to sharply, as it might and does occur occasionally by mistake. Sitters move the eyes from one point to another, and if not spoken to promptly a very few seconds might spoil the whole preparations as often as repeated. Winking has no bad effect, but looking from one point to another has.

The pose has to be got little by little, thus:—Place your hand so and *keep it there,* while the other is *placed so,* and do not *alter* any other part while I correct your cuffs, or any other portion of dress; nor try to assist in doing so, because your movements in so doing may throw other parts wrong. The artist will attend to all without you asking is this hand or the other right, which would give you a careworn expression. Have full confidence in his abilities, or do not be pourtrayed by him.

Children under Seven Years should be accompanied by their best loved friend if possible, who should be ready to assist at the least hint, but do no more than is requested. Never threaten them if they do not sit still, nor tell them not to cry, because if you do they are sure to do it; do not give or promise them cakes or sweets. The conversation should not be about *taking them;* it should be about ponies, pussies, doggies, birds, or any varieties of toys most suited to their tastes. In groups the parents are generally so anxious about their little ones that they themselves are the most difficult to take. Do not talk to or attempt to assist others in the group while being posed, let each one attend to his own instructions only. A giddy or inattentive person in a group is a nuisance to all concerned.

Examples of Colours as Produced by Photography.—Pure white is too light, bluish white is better, yellowish or brownish white is best. Honiton or Maltese lace, of an open pattern, over black or grey, is a beautiful quiet white. Tints in juxtaposition—thus black and grey joining give greater apparent depth to the one and lightness to the other; light blue is nearly white; dark blue, mauve, &c., about half lighter than they appear to be; light pink up to dark red about the same scale as light bluish grey up to bluish black; brown as reddish grey up to reddish or the deepest black obtainable.

The face, to a true rendering of nature, requires the correcting pencil of the most skilful artist in modulation, on account of confliction of juxta contrasts of reds, blues, browns, yellows, pimples, freckles, vulgarities, &c., &c., causing disagreeable and uneven spottiness not always observable in nature. A tasteful display of almost any variety of dress, well broken up with lace, ribbons, jewellery, &c., avoiding violent contrasts, is always pleasing in photographic portraiture.

Conditions.—The rules, prices, and management of this establishment are not guided by that of any other. Neither is any work done on approval but to order and to the best of the artist's ability, who has had daily experience with every class of society for over a quarter of a century, and has given unbounded satisfaction wherever art portraiture is known, the very small minority of grumblers being those who do not know it, or that they are incapable of being any better posed, according to the style which they have selected and insisted upon. Sending by post, &c., at your own risk. Fees, postage, &c.—One dozen *cartes*, &c., or under, per book post, each parcel, 3d.; under cover, 6d. Send stamped directed envelope for all replies. Not accountable for any works or photographs left after three months.

ON THINGS IN GENERAL.

A very ingenious gentleman, whose effrontery was equal to his command of language, used—and for aught I know to the contrary may still—to go about the country under the name of "Parallax" to deliver a series of lectures to prove that the earth is not a globe, as infatuated philosophers contend, but is as flat as a pancake.

Among his proofs was the following:—A vessel gradually disappearing in the offing is supposed to get lost to sight by reason of the rotundity of the earth hiding it from view, but, said "Parallax," if you get a telescope it will all come into view again, and when lost to sight in that telescope a more powerful one would bring it back again, and so on. Surely Mr. Gresham, of New York—who by means of his "phantasmograph" expects to be able to see an artificial cloud about a mile high and a thousand miles away—should take lessons from the philosopher I have named, so as to induce the seafaring public to believe that his notion is of any value. There has been a deal of wonderful arguments to prove or disprove the possibility of carrying out Mr. Gresham's idea, but I am afraid the difficulty I have raised is the toughest of the heap. But inventors are a sanguine race; their ardour is unquenchable. Rarely, though, is there so sad a result as has recently been recorded in the fatal accident that befel a chemist who had invented a new mode of rendering cyanide of potassium harmless. He paid the forfeit of his life through over confidence in his discovery.

There is no fear that his example will be followed with regard to his own method, at anyrate. I find, I must confess, great difficulty in believing that it was an accident at all, for surely he must have been aware that, long years ago, prussic acid had been swallowed in public, immediately followed by a suitable antidote, with no evil effect whatever occurring. I speak of the ordinary prussic acid of the shops, such as the *Daily News* states is used for killing dogs, &c., but which, instead of being of the strength of a drop to a quarter of a pint according to that authority, is more like a drop to a quarter of a teaspoonful of water.

Really, the inventive faculty is about the only thing there is no dearth of at present, even in newspaper paragraphs. I find again that photographers are once more recommended to be taxed through their *cartes de visite,* because, forsooth, the sale of such portraits panders to snobbery and caddishness—this, too, in a paper belonging to a class whose only *raison d'être* is the retailing of nasty matter to those whose walk in life does not bring them within reach of a personal knowledge of such doings and the doers.

The newest inventor would seem to be one against whom we really have cause of complaint for his tardy appearance. Just as in mathematical science the circle-square turns up periodically, so in our case we look for the genius who is to produce stereoscopic effect by means of a single picture, and we might as vainly hope to convince the circular philosopher as the stereoscopic of the error of his views. What a wonderful thing is the indestructibility of error! One would have thought that enough had been written to prevent any resuscitation of this absurd proposition!

I was much interested in reading the Dublin notes that were recently given in these pages; but I certainly was not prepared to find a very old style of exhibiting photographs very popular with a large Liverpool firm described as a novelty. I can also endorse the writer's views on the Cadett's pneumatic shutter, but I think Dublin is by far from being the only place where the foot is used for compressing the india-rubber ball. "Necessity is the mother of invention," and no one who once had to squeeze the ball tight for a long exposure of (say) a minute would risk bringing on cramp by so laborious a muscular exertion, and the pedal pressure would be the most natural way out of the difficulty.

There has been quite a long roll of inventors posing before the photographic world the last few weeks. I cannot close my month's record without alluding to the brilliant method of Herr Brandt, of Bayreuth. I give his name, &c., in full, that inquiries may be made regarding possible patents. He recommends that a couple of drops of glycerine be rubbed on the back lens of the portrait combination in order to produce more artistic effect. Doubtless he is a man of artistic feeling and æsthetic longings, who has seen with disgust the hard, sharp pictures so much in vogue among so many photographers, and he has invented a method to obviate any such crudeness in the future of our art, and, thanks to him, there are to be no more hard outlines, sharply-defined features, and the materialistic realisation of textures and surroundings. A disciple of the higher art he will introduce a vague and more mysterious indication of external objects, and give to his own and his disciples a greater and purer spiritual appreciation.

Free Lance.

Contemporary Press.

THE PERILS OF SCIENTIFIC EXPERIMENT.

[Observer.]

A most unfortunate accident which has occurred at Prague recals in many of its details and circumstances the quaint traditions that were once prevalent with regard to the mediæval alchemists. Professor Fischer, of the Prague gymnasium, a young man, only twenty-five years of age, and of the highest eminence in his profession—that of chemistry—has come to an untimely end, under the most melancholy circumstances. No one needs to be told that cyanide of potassium—a drug largely used in photography—is a poison of the most deadly character. Its active ingredient is prussic acid. Prussic acid in its pure, or—as chemists would term it—"anhydrous," form is a substance too dangerous to be kept, or even manufactured. If a glass capsule containing a wineglassful of pure prussic acid were broken in the pit of a theatre those amongst the audience who were nearest the doors might perhaps escape, but the great majority would be killed upon the spot. The prussic acid ordinarily sold, and occasionally used for killing dogs and cats, contains about a drop of the pure acid to a quarter of a pint of water. Pure prussic acid no chemist dare keep. He might as well compress a ton of dynamite into a single cartridge—supposing such package to be possible—and then leave the deadly parcel lying loose upon his table. Cyanide of potassium is not, like prussic acid, volatile. It is a white powder, rather resembling flour or chalk. It is, however, so poisonous that a mere pinch of it sprinkled over an open wound or sore will cause almost instantaneous death; that a fragment almost imperceptible to the eye will, if swallowed, prove equally fatal; and that its mere smell has before now produced immediate death. It was, it seems, the ambition of Professor Fischer to discover some means of rendering cyanide of potassium harmless. We can do this with gunpowder—although the analogy is not strictly exact, the means employed with gunpowder being mechanical, while those for which Professor Fischer sought were chemical. We know what happens if a light is applied to a keg of gunpowder. If, however, we mix the powder with four or five times its bulk of sawdust a torch may be held to it with impunity. The mechanical resistance of the sawdust makes it impossible for the explosion to at once spread to the whole mass, and the consequence is that a sort of splutter ensues, like that of a squib or blue light. Professor Fischer's idea was that if cyanide of potassium were thoroughly mixed with sal ammoniac it would be as harmless as gunpowder mixed with sawdust, but would still remain equally available for all those purposes of photography for which it is at present absolutely indispensable.

In the course of his researches Professor Fischer made a mixture of which in his own mind he felt assured would meet the conditions of his problem. He compounded the cyanide with some other substance, and then—turning to his laboratory assistant—said, "Science has now so far advanced as to be even able to render harmless so dangerous an agent as cyanide of potassium." With these words he tasted the mixture, and was almost in an instant seized with the most violent and excruciating agonies. He at once implored his assistant to send for medical aid. Cyanogen, however—whether as prussic acid or as cyanide of potassium—kills almost instantaneously. In a few seconds Professor Fischer was beyond help. We are told that there is no possible reason to suppose that a deliberate suicide had been planned and carried out under the mask of an experiment. On the contrary, there is every reason to believe that the professor has met the fate which befel only too many of the early chemists and their predecessors, the alchemists. We know, now, what will happen to any experimentalist if he dips blotting-paper in nitric acid, washes it, dries it, and then incautiously treads upon it. What happened to the man who is believed—for his records perished with him—to have first discovered fulminate of silver is matter of scientific record. That he was engaged in researches upon the fulminates, and, more especially, upon the fulminates of the higher metals, was well known. How it precisely came about that he disappeared as he did will always remain matter of conjecture. There came one day a puff, a slight shock, and a smart noise as if some one had inflated a paper bag and then burst it between his hands. Of the professor himself, of his laboratory, of his apparatus, and of much else within the radius of some yards, not a vestige or trace was left. So it used to be with the alchemists—the heritors of the hidden wisdom of Böhme, Roger Bacon, and Albertus Magnus. They were always blowing themselves up, or asphyxiating themselves with some noxious vapour. For a man who knows nothing, or next to nothing, of chemistry it is a very dangerous game indeed to mix together a couple of substances of which he knows nothing, and then bray them in a mortar. Common sulphur is harmless stuff enough, so is charcoal, so is nitre; but let an ignorant man mix the three and apply a light to them and the result will much astonish him. When, of old, an alchemist was reduced to fragments in this fashion our ancestors had an easy explanation. He was a magician—they used to say—and the devil had come suddenly and carried him off. There was a time, between the days of Roger Bacon and those of Davy, Black, and Cavendish, when the foul fiend was thus always carrying off alchemists. We know now how it happened. If a man goes into a chemical laboratory and takes up a big beaker, and pours into it the contents of the first two bottles that are ready to his hand, the probabilities that he will be reduced to atoms on the spot are sufficiently serious to call for his careful consideration.

Apart from the sad fact that a young man with a bright and indeed brilliant future before him should be thus suddenly cut off, the death of Professor Fischer has another moral. Chemistry—whatever Mr. Lowe may have to say in praise of civil engineering—is the science of the world and of the future. The bridge which it takes the engineer years upon years to construct the chemist can in as many sixtieths of a second reduce to atoms. Chemistry has given us the balloon; it has put into our hands gunpowder, nitro-glycerine, dynamite, and, above all, fulminate of gold—an explosive so terrible that if an ounce of it be left in a stoppered bottle, its grains, falling amongst themselves by their own weight, will create a convulsion sufficient to lay all London in ruins. It has given us poisons so subtle that, were we to resolve to employ such means of warfare, we could sail in a balloon over the camp of the enemy and drop upon it a shell, the bursting of which would kill every human being a mile within its range. Then, too, chemistry has given us disinfectants. To the chemist we owe carbolic acid, chloride of lime, and permanganate of potash. Chemists have taught us to disinfect our sewers and drains, to ventilate our houses, to burn gas instead of oil, and to light our streets with what is more powerful than even gas itself—the electric light. It is to chemistry, indeed, that we owe almost all the comforts of everyday life. But, on the other hand, the possibilities of chemistry are almost too terrible to be contemplated. As the science at present stands any student can, if he have access to a well-stored laboratory, carry away with him in a pill-box matter sufficient to lay London in ruins, or to poison the whole community of its inhabitants. The chemist can—as every schoolboy knows—convert water into ice in the centre of a red-hot crucible. He can construct a shell the size of a cricket ball which will explode the moment it touches the water, and overwhelm in flames a hostile fleet. Indeed, the chemist reduces the world to its original and primal elements. For him, even more than for the engineer, nothing is impossible. And yet his power—vast as it is—is limited. He can more easily destroy than construct. He can take life, but he cannot give it. He can level a city with the plain, but he cannot build it again. He can create prussic acid, but he is ignorant of its antidote. He is like the fisherman who rashly opened the vessel sealed with the ring of Suleiman Ben' Daoud. The forces at his control are beyond his command; the powers he can evoke he cannot lay. It is the old story of Cornelius Agrippa—those who trifle with Nature's secrets do so at their peril.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 2	Edinburgh	Hall, 5, St. Andrew-square.
,, 2	Bristol Amateur (Ann. Meeting)	Museum, Queen's-road.
,, 2	Photographers' Benevolent	160a, Aldersgate-street.
,, 3	South London	John-street, Adelphi.

OUTDOOR MEETING OF THE MANCHESTER PHOTOGRAPHIC SOCIETY AND THE LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

On Saturday last, the 21st instant, the above-named societies met together at Hawarden, the residence of the Right Hon. W. E. Gladstone, who had kindly given permission to photograph the old and new castles and other views in the beautifully-situated park. On arriving at Hawarden they were welcomed by Mr. Gladstone, who informed them of the most likely points of interest where views and "bits" might be taken.

A more charming day for photography could not have been chosen, and, though the afternoon was a little cloudy and the light rather poor, the morning was all that a landscape photographer could desire, giving an opportunity seldom to be had of securing views with beautiful trees and foliage perfectly motionless.

The old castle, being a morning view, and surrounded with ivy and light-foliaged trees, was one of the principal subjects for the camera.

Hawarden at the conquest was held by Barons of Monthault (now Mold), under Hugh Lupus, Earl of Chester. It then fell to the Stanleys, but after the execution of James, Earl of Derby, in 1651, it was forfeited and sold to Serjeant Glynne, Lord Chief Justice, and one of Cromwell's Privy Council. The present castle was built by Sir John Glynne, in 1752.

Several excellent views were obtained of the new castle, and here a group was taken by Mr. L. W. Weber and Mr. J. H. T. Ellerbeck, with the castle for a background.

Soon after four the party mustered at the Glynne Arms Hotel, where about thirty sat down and did ample justice to a substantial tea. The President of the Manchester Photographic Society, Mr. Alfred Brothers, F.R.A.S., in the chair. After tea another group was taken by Mr. Potter and Mr. Ellerbeck, and then a start was made to the railway station for home. The group taken by Mr. Potter on a collodio-bromide plate, and the one by Mr. Weber on a Kennett emulsion plate, proved exceedingly successful.

On counting up the results of the day twenty-two cameras had been used and one hundred and ten negatives taken, almost every dry process of the present day being represented, besides which several members had been engaged in sketching and painting.

It was agreed on all sides that a most pleasant day had been spent and that another reunion of the two societies should be arranged.

In order to avoid any complaints of too short notice, the Secretaries of the respective societies desire to announce that it is intended to have a joint excursion to Miller's Dale in June next.

Correspondence.

PROTECTION FOR THE HANDS.

To the Editors.

Gentlemen,—I observe that in the last Journal you recommend gloves. May I add to your suggestion that of putting on to the left hand a gauntlet of the same material, which I have used for many years with good effect, as protecting the dress when developing large plates. I procured mine and that for my pupils at Messrs. Cow, Hill and Co., 46, Cheapside, E.C.—I am, yours, &c.,

Duffield, near Derby, W. Harding Warner.
September 23, 1878.

RE SWAN'S PLATES.

To the Editors.

Gentlemen,—Will you allow me to correct a mistake which has arisen somehow between the Secretary of our Manchester Photographic Society and yourselves? At the last meeting of that Society your report says:—"Mr. W. J. Chadwick showed some results on Swan's plates. One of the negatives represeuted Mr. Chadwick holding a wax vesta, by the light of which it was taken." It should have said—*a transparency* printed from a negative (portrait of himself) by the light of a wax vesta.—I am, yours, &c., W. J. Chadwick.

Manchester, September 24, 1878.

STEREOSCOPIC TRANSPARENCIES.

To the Editors.

Gentlemen,—It appears by your article of the 13th instant, referring to my criticisms on Mr. Brooks's paper, I must have expressed myself badly. You say—"We do not catch Mr. Oakes's meaning with regard to extreme sharpness or the reverse, especially when we look back at his preceding sentence, in which he speaks of the desirability of sharpness." What I intended to convey to your mind is this:—That for my own part I look upon extreme sharpness in a stereoscopic transparency as desirable, but in case Mr. Brooks or any one else choose to make a virtue of the fact that any degree of what you are pleased to term "woolliness" may be obtained in contact printing, I claim the supposed advantage in camera printing as well.

Where gradation is required from a dark to a light tint, or *vice versâ*, as is the case in printing from mask negatives for combination transparencies, there is a decided advantage in producing a certain degree of woolliness or softening of the edge, so that the combined pictures may blend into one another at the edge where the combination takes place.

As this may not be clear to many of your readers I must ask you to let me explain that in combination printing there are a number of mask negatives required. These negatives are for various purposes, but the main idea of using them is, as their name implies, to shut out one portion of the negative while the other portion is being printed. Supposing, for instance, you had a beautiful cloud negative that you wished to combine with a landscape negative, in which the sky and clouds have been sacrificed for the purpose of giving a suitable exposure to the landscape. You would first print the landscape in the camera, masking out the sky; then on another glass you would print the clouds and sky, masking out the portion to be occupied in the finished transparency by the landscape, so that when the pictures are plaeed face to face and mounted no one could tell on looking at the picture by transmitted light that any "dodging" had been resorted to. In a transparency of this kind the landscape portion is printed on the back of the front glass, and the sky aud clouds on the front of the back glass, so that when the two glasses are brought together *in situ* the two pictures occupy as nearly as possible the same plane. This is managed in the printing, and will be explained in my forthcoming paper.

I grant there is a decided objection to camera printing on the score of the length of exposure required in a poor light, and this is the only real objection that can be brought forward against printing in the camera. However, amateurs and others who are content with the ordinary results of contact printing are at liberty to continue that method, but I am writing, as you remark in your article, for those who wish to go in for high-class stereoscopic work, and to produce an endless variety of effects equal and, if possible, better than those done by the late Mr. Breese.

I should like to suggest, by the way, that as speed in production is a *sine quâ non* with professional photographers, or, rather, with manufacturers and publishers of stereoscopic work, there is no reason why a combined negative should not be made and printed either in the camera or by contact for the market, instead of printing each transparency in the camera, which necessitates two or sometimes three printings for each slide.

With reference to what I said as to "anything in the shape of apparatus at all coupled with the smallest modicum of ingenuity" would suffice to produce high-class work, I can only say that I wish the remark to be repeated with, if possible, more emphasis than before; for I suppose I am justified in concluding that any one who is going in for stereoscopic work possesses at least a small stereo. camera and a pair of single or double-combination lenses. Well, such a person may (with the addition to his camera of some arrangement to bring the lenses together or separate them at will), as I said before, with the smallest modicum of ingenuity make all the rest of the apparatus required for a few shillings—say half-a-guinea, at the most—and I may add that my own apparatus made after the model of Mr. Breese's, and with improvements not included in his (because I had all the advantage of his experience to guide me in constructing it), did not cost me as much.—I am, yours, &c., S. H. Ashley Oakes.

16, *Silverwell-street, Bolton, September* 20, 1878.

Miscellanea.

South London Photographic Society.—The first meeting of this Society for the session will take place on Thursday next, October 3, in the Rooms of the Society of Arts, Adelphi, when Mr. E. Dunmore will read a paper on *Varieties*, and Mr. F. York will narrate some of his experiences in Paris.

Trade Catalogue.—We have received from Messrs. George Matland and Co., 180, Commercial-road, their catalogue of photographic apparatus, chemicals, aud materials, which is replete with everything that photographers can require. It includes lenses, cameras, head-rests, and all the materials for producing negatives and prints, the department of *mounts* being unusually well represented. We here also acknowledge the receipt of samples of *carte* and cabinet mounts, which appear to be of excellent quality.

The "Crossed Swords" Albumenised Paper.—Messrs. Neustadt aud Co., 25, Mincing-lane, have sent us a sample of this well-known paper, the trade mark of which is doubtless familiar to all. Having given it a careful trial we have to speak in very high terms of its excellence, the surface being faultless and the tones and brilliance of the resulting prints unexceptionable. We do not know what toning bath has by others been found to give the finest prints when used in connection with the "crossed swords" paper, but in our experiments we made use of the following:—

Chloride of gold	1 grain.
Acetate of soda	30 grains.
Water	8 ounces.

The above formula, it will be observed, is one of those given in our Almanac as being always good and reliable.

The Recent Thames Disaster.—The staff of photographers at the War Department has been busily engaged in obtaining photographs of the wreck of the *Princess Alice*, as it lies on the foreshore at Plumstead, and partly within the Arsenal boundary. When beached, the two portions of the vessel were placed with their open ends next the river, in order that the water which entered with the rising tide should drain off at the ebb; but this has rendered the examination of the fractued parts a matter of difficulty, and the task of photographing those parts more difficult still. The work, however, has been surmounted by means of rafts, and, by taking advantage of dead low water, some very good negatives have been obtained, from which prints will be taken for the Coroner's jury and the Board of Trade inquiry. It is said that the last time the *Princess Alice* was photographed was the occasion when she was painted, gilded, and decorated for the conveyance of the Shah of Persia through the Pool and the docks, crowded with shipping, to Greenwich Hospital and back to Westminster, in memory of which service she has been known on the river ever since as "the Shah's yacht."

Photographic Recollections.—She said she "never could get a good picture, though she had tried a great many times—such horrid, ugly looking things, her friends would never put them in their albums." *She* didn't care, of course, for *herself*, if she could only satisfy others. "Some people never do *take well*, and I think I am one of them. I don't know what it is—suppose they look like me; but somehow or other they are not what I want to give my friends. My husband says I am expecting too much, and that I ought not to blame the artist. He says the first proofs look just like me, but I don't consider him a good judge. Now I have brought one that I had taken a long while since; let me see, ten or twelve years since. I don't know but it may be nearer fifteen; any way it was before Charley was born, and he is thirteen in March. Of course the dress is out of style; but just see, Mr. Artist, the *difference* in the way the face is taken." We smiled as we saw the difference and patiently went to work to repair the ravages which time, decay, and the dentist had made in the once rotund and rosy features of our sensitive customer. 'Twas *retouching* did the business, and relatives and friends marvelled at its *restorative* power.

"It smoothed away the lines of care,
And wrote new youth and beauty there."

——Sometimes people are unreasonable. We had done our level best to photograph an ambrotype, all that was left to the memory of a sainted mother. It was to be four-four, ink finish, and framed as per contract. Our work was done in time for the day of delivery, and the only surviving daughter, under whose order we executed the deed, came to procure and pay for the same. We noticed it did not seem to please her, and awaited the result. She said "it was not natural—didn't look as she did; never should know it was mother." We inquired mildly if it was not a true copy of the ambrotype from which it was taken. She said, "that may be, but *nobody ever thought that resembled mother at all;* and that was why I had it copied, so as to have something that would sort of look like her when she was living."—— He was a *freshman*—had never yet been "taken." His girl was with him, but not for a group. She "slicked" his hair and with loving fingers adjusted his "tie;" then retired to the reception room till the operation was over. We "posed" him, bid him be happy, keep perfectly still, *look directly here* (pointing to the camera), and removing the cap, we stepped quietly aside to wait the half minute exposure. Our sitter had left his chair and obedient to orders was gazing intently *into* the camera, his eye winkers fairly brushing a Dallmeyer that was aimed at him. When we intimated that we thought he had *moved*, he wanted to know if it would hurt the picture—*Anthony's Bulletin.*

Photography in Court.—At the Westminster County Court, on Tuesday, the 24th instant, the case of Richmond *v.* Artis was heard before the presiding judge, in which the plaintiff, a lady residing in Sutherland-street, Pimlico, sought to recover the sum of £2 which she had paid to the defendant, a photographer carrying on business at Brixton, for the purpose of photographing the tomb of her sister, who had been burried at Kensal Green Cemetry a year ago. The plaintiff, for whom Mr. Lewis appeared as solicitor, stated that she called upon the defendant and requested him to photograph the tomb in question, and that the portrait was to be of a size similar to that produced in court, instead of which he had executed one of a smaller size, and which, instead of being an accurate representation of the grave, was indistinct and out of perspective, and, besides, it contained the impression of other graves. In reply to his honour the plaintiff said there was no contract in writing, and that she paid the money because the plaintiff had guaranteed that the work should be done in a superior manner, and, further, that the defendant said that in the case of strangers it was customary to pay when the order was given. This being the plaintiff's case, the defendant said the plaintiff called on him and required the work in question done, and he told her that as he had to go a considerable distance his charge would be five guineas, to which she consented, and paid £2 merely as a deposit. He had never been able to get the balance, but when he threatened to proceed against her she, after having retained the proofs nearly five months without paying the balance due, now actually had the impudence to sue for the deposit paid on account. The learned judge at this stage of the case considered this an action which should never have been brought, and gave judgment in favour of the defendant with costs, who intimated in court that he would now sue the plaintiff for the balance remaining due. His honour considered the defendant justified in doing so, and the case terminated.

ANSWERS TO CORRESPONDENTS.

Photographs Registered—

W. G. Helsby, Denbigh.—*Portrait of Mrs. E. Jon*

J. Owen, Newtown, North Wales.—*Six Views at Berriew, Montgomeryshire.*

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

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

A. Brothers.—Received. Will be immediately attended to.

Aspirant.—A kit-cat portrait measures three feet six inches by two feet four inches.

G. S. Innes.—By employing a more diffused light the texture of the paper will not be so strongly reproduced.

P. R. P.—You are quite right in the surmise; but the subject is one which is necessarily unsuited for discussing in these pages. Another reason has been given, but we think it untenable.

J. Beringer.—We do not know whether Mr. Harrison, of Falmouth, gives instructions in carbon printing; if not, we advise you to come to London and obtain lessons from the Autotype Company.

F.B.S.—1. We are unable to state the price of the book.—2. By reducing the proportion of the borax the toning bath will act more energetically; but we much prefer the acetate or carbonate toning baths.

Thos. Harrison.—Both *a* and *b* are excellent specimens of window portraiture; but they would have been improved by a darker background. The face of *c* is rather flat, but the detail leaves nothing to be desired.

F. Harrington.—To produce magic-lantern slides use dry plates and superposition. If you have a copying camera the wet process may be employed.—2. The slide carrier may be obtained at the establishment of the Sciopticon Company, Great Portland-street.—3. Two hours, if it be treated carefully.

Greentype Photographer.—There *are* processes for producing blocks for illustrating periodicals without requiring the services of a skilled engraver. These can be printed along with ordinary type. Some of these processes are patented, others have long been open to the public. For further particulars see our Almanac for 1876.

A. R. J.—Place the lens in lukewarm water, the temperature of which must afterwards be raised until the balsam by which the lenses are cemented becomes softened. Now separate the lenses by sliding one of them over the other. Clean the surfaces with a little turpentine, benzole, or collodion, and then re-cement them by means of fresh Canada balsam.

J. H. Lloyd.—Unless we saw a negative we could scarcely indicate the cause of the greenish colour. Presuming that you use the wet collodion process and develope with iron, fixing with cyanide of potassium, it is possible that a trace of iron may have been left in the film, which would be acted on by the cyanide, producing a blue colour. If we are wrong in this assumption you must supply further particulars.

Country Parson.—Stains on the hands caused by alkaline development are, indeed, difficult to remove. They resist the solvent action of strong cyanide of potassium, but they yield to iodide of nitrogen—an exceedingly dangerous compound, and one the employment of which we cannot recommend owing to its explosive nature. The method we now invariably adopt is a simple and successful one, and consists in friction with a lump of pumice stone, using soap and water as a lubricant. The liability to stain the fingers will be greatly reduced by making use of a flat dish for developing. These are now extensively used, and may be either easily made or procured from any dealer in photographic materials.

A Ferrotyper.—Yes; we are quite familiar with the subject of developing collodion positives so as to give them a metallic lustre; but we do not carry our admiration of them so far as you seem to do. The effect may be produced by the addition of sulphuric acid to the developer, but it is so long since we tried it that we are unable to state the proportions we found best. The way to ascertain this is to divide a twelve-grain iron developer into two portions, adding to one of them a few drops of the acid, and to the other about twice as much. Next, develope pictures with both and compare the results. Thus, by increasing or decreasing the proportion of acid, you can obtain any degree of metallic sheen that is desired.

Major Gubbins.—1. We cannot suggest any better remedy for "oyster-shell" markings on the surface of the plate than prolonged draining after the removal of the plate from the bath. This must be done in a damp atmosphere. Transfer the plate to a damp box on the bottom of which is placed a pad of blotting-paper, and allow it to drain for at least ten minutes. New and horny collodions are more liable to this defect than old and porous samples; the addition of a few drops of water to a horny collodion frequently proves a remedy.—2. The last traces of acid may be eliminated by the direct addition of carbonate of soda—of course previously dissolved in water.—3. We have never tried the sample of collodion mentioned. It may probably be improved by the addition of a little iodide of ammonium.—4. In all probability the cause of the difficulty in obtaining the photograph you desire of the distant plains will be found in the state of the atmosphere, caused by the ascending currents of heated air. You are well aware of the perturbations of the atmosphere immediately over any heated object, such as a brazier of burning coke or charcoal, and your difficulty, we imagine, has a strict relationship to this phenomenon. Select a time for exposing the plate when the ground is cool and the atmosphere warm.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For the two Weeks ending September 25, 1878.

These Observations are Taken at 8.30 a.m.

Sep.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
12	30·10	98	71	52	56	58	SW	Hazy
13	30·12	95	67	47	51	55	NNW	Fine
14	30·02	98	71	48	52	55	NW	Hazy
16	29·72	97	61	51	53	59	W	Cloudy
17	29·99	80	67	52	56	59	W	Overcast
18	29·65	—	63	58	62	63	W	Raining
19	29·91	92	67	45	49	54	W	Fine
20	29·83	86	60	47	48	50	W	Cloudy
21	30·17	90	61	43	49	52	WNW	Fine
23	29·46	76	60	47	48	50	NW	Cloudy
24	29·60	79	60	40	42	43	NW	Cloudy
25	29·68	73	60	42	50	50	WSW	Cloudy

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THE BRITISH
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No. 961. Vol. XXV.—OCTOBER 4, 1878.

CHEMICAL TESTS FOR TRANSFER PAPER.

The darkening action of light on certain varieties of paper is a matter of interest not only to the photographer but to all those who practise the various graphic and reproductive arts. The engraver, typographic printer, lithographer, and more especially the chromo-lithographer, may have their results considerably modified by a change of tint in connection with the paper employed as the basis of his work.

It is, however, satisfactory to find that two independent experimentalists, recently writing in our columns, have come to the conclusion that a rag paper, when properly made and so far bleached as to require no tinting, may safely be employed for the manufacture of transfer paper, as a paper of this kind undergoes no alteration by a reasonable exposure to the action of light. Manufacturers are thus placed in a position to secure themselves from mischief by employing a thoroughly good rag paper for the preparation of anything intended to permanently receive the carbon picture.

Notwithstanding all this it appears to be a well-established fact that most vegetable fibres can be so thoroughly purified as to resist the action of light; but, at the same time, it is well to bear in mind that this is seldom the case in actual practice, as the paper-maker is usually satisfied if he produce an article which is white when sent out of his manufactory. The method of testing fibre with sulphuric or nitric acid is likely to prove useful to manufacturers of transfer paper, as this test, if carefully conducted, is not likely to allow a bad sample of paper to pass muster, it being more likely to condemn a reasonably satisfactory sample than to allow a bad one to pass.

In conducting this test care should be taken that the samples are dry when immersed in the acids, otherwise sufficient heat might be generated by the combination of the moisture with the acid to cause a darkening in cases where no change of tint would have occurred had the test been conducted with sufficient care. An error on this score is naturally more liable to happen when sulphuric acid is employed than when nitric acid is used, as much more heat is evolved by the combination of the former with water than by the action of water on the latter. The tint assumed by vegetable fibre when immersed in nitric acid is often indicative of the source of the fibre. For example: ordinary hemp acquires a yellowish tint, New Zealand hemp becomes reddish, while wood fibre generally becomes brownish, and esparto takes a lighter brown tint. It is premised that, in each case, the fibre has been partially cleansed and sufficiently bleached to appear fairly white, but that it has not been so far treated with detergents as to remove the whole of the incrusting matter.

At the present time the most important paper-making materials, other than rags, are esparto and wood—the wood being generally derived from coniferous trees, and in the majority of cases from pine or fir. Now it so happens that there are several more or less characteristic and very easy tests by which imperfectly-cleaned pine or fir wood may be detected in paper; but such tests are naturally of small practical value to the maker of transfer paper, as a negative result does not by any means afford him a guarantee that he may safely employ the sample, and a positive result merely indicates that the particular batch tested is unsuitable for use as the basis of a photographic picture. One of the best known of these tests depends on the action of an aniline salt on the incrusting matter of the fibre, and this test is easily applied either to sized or unsized paper.

A convenient solution for testing paper may be prepared by treating an ounce of commercial aniline with two ounces of hydrochloric acid, and then adding forty ounces of water. When this solution is filtered it is nearly colourless and is ready for use. A piece of pine or fir wood moistened with it rapidly acquires a bright yellow colour; and all ordinary commercial papers containing wood fibre acquire a similar tint if the hydrochloride of aniline solution is allowed to remain on them for a few minutes. This yellow colouration is more intense as the purification of the wood fibre has been less perfect; and in the case of the greyish "wood middles," which are sold for making the insides of cardboards, the colouration is almost immediate and very intense.

We amused ourselves the other day by tearing small samples of paper from the margin of ten English books, ten French books, and ten German books—all of which had been published during the last three years. Each of these samples was tested with the above-described solution of hydrochloride of aniline. The result was that out of the ten English samples only two showed signs of a yellow colour after a period of five minutes; four of the French specimens acquired a yellow tint in the same time; while of the German papers no fewer than eight out of the ten showed signs of containing wood fibre. These results show that extreme caution should be exercised in the selection of papers for making transfer paper, especially when the article is manufactured abroad and it is difficult to obtain much information concerning its origin.

ON NITRO-GLUCOSE AND ITS USES IN PHOTOGRAPHY.

The practice of emulsion photography having now been firmly established, not only in France but also in Belgium and Germany, our continental *confrères* have commenced the exploration of some of the collateral branches of photo-chemistry, which have long since been identified with emulsion work in this country. At a recent meeting of the Brussels Section of the Belgian Photographic Association M. de Pitteurs read a lengthy communication on the subject of nitro-glucose and its uses in photography, but more especially in emulsion work; and in the discussion which followed a part was taken by Dr. van Monckhoven, who, as our readers are aware, was one of the first to bring this substance before the notice of photographers.

We have ourselves experimented largely with nitro-glucose, not only in connection with emulsions but also in collodion for bath purposes, as well as in printing; and while we, in common with many others, have recognised advantages in its use under some circumstances, we have at times found it perfectly inoperative, if not actually injurious, and we propose to say a few words on the subject of this uncertainty, as we are aware that in some quarters considerable disappointment has accrued from the failure of the brilliant hopes held out from its use.

We may at once express a very strong opinion that the chief error has been in looking upon nitro-glucose as a substance of a certain fixed and uniform composition, whereas in reality there is every reason to suppose that it is at least as variable in its nature as pyroxyline. We all know—at least those of us do who have systematically attempted the manufacture of pyroxyline for special purposes—how slight a variation in the conditions of manipulation suffice to entirely upset the standard of the product obtained, even when employing different portions of the same materials; but when it is borne in mind how much more exigeant in the matter of niceties of temperature and of the strength of acids the nitro-glucose is, it is scarcely to be wondered at if equal variety of result be obtained.

Then, again, the nature or quality of the raw cotton or other material employed in the manufacture of pyroxyline is supposed—and with good reason, no doubt—to exercise an important influence on the character of the result. In its purest form the material acted upon is supposed to be cellulose, but who shall say what is the exact nature of the resinous and gummy impurities which are present in different samples of the raw article? And who, again, turning to sugar, is to stand sponsor for the quality or identity of composition of the different forms of sugar which find their way into the market from various sources? This is no overstrained view of the matter, as we have in our own experience met with samples of so-called "refined" sugar which absolutely refused to give a product at all answering to the general characteristics of nitro-glucose, though submitted to precisely the same treatment as another sample possessing no apparent difference in quality or appearance.

But the physical differences actually noticeable in the product itself, whether arising from variation in the composition of the material employed or in the manner of its treatment, are certainly sufficient alone to raise the suspicion of at least some variation in its chemical behaviour. Thus the colour of the newly-prepared nitro-glucose frequently exhibits a noticeable difference, varying from a pure white to a more or less pronounced grey, or from a feeble greenish tint to a decided yellow. It is always more or less coloured previous to its removal from the acid mixture; but the tint is then due to the presence of nitric fumes, the colours we have mentioned remaining permanently after the complete elimination of the acid. When the product is colourless, or presents a greyish, satiny tinge it is usually found to be more stable in character than when it is either green or yellow. It gives no precipitate or cloudiness with silver nitrate when newly prepared, whereas the yellow description takes a milky tinge almost immediately after solution if brought into contact with silver in the dark.

The operation of freeing the pasty mass from acid by kneading it under water is one of great tediousness, and it is questionable whether the desired result is ever thoroughly attained under such circumstances. So great is the persistence with which the acid clings to the solid mass that it may be kneaded with powdered chalk, and left in this condition for hours, and still retain a strongly-acid reaction. The only effective means of thoroughly neutralising it is in the state of solution, and this is best performed as recommended by Dr. van Monckhoven, we believe. The nitro-glucose, after being freed as far as possible from acid by washing in water, is dissolved in alcohol, and the mixture shaken up with powdered chalk until, on testing with blue litmus-paper, it is shown to be free of acid. It is then filtered clear of the insoluble salts of lime and poured in a fine stream into a quantity of cold water, when it will be precipitated almost in the state of powder. After changing the water several times to remove the soluble lime salts it may be again kneaded into a mass, which will be free from acidity as well as from colour.

When thus prepared it will be found much harder and more porcelain-like than the coloured product which is merely washed, and its action in the presence of silver, as well as on the density of an emulsion, is scarcely less noticable; in fact, it is necessary, before it can be utilised as a source of density, to submit it to a slightly-elevated temperature for a few days in the state of solution as recommended by Dr. Monckhoven, or for a more prolonged period at ordinary temperature, whereas the yellow or green product will, in the majority of cases, require no such treatment. If two samples—one purified as above described, the other in the crude state—be enclosed in carefully-corked bottles in the dry state and placed in a dark cupboard, as far removed as possible from all disturbing influences of heat and light, it will be found that after the lapse of some time, varying from a few days to three or four weeks or possibly a little more, the unwashed sample will have undergone a peculiar sort of decomposition; instead of presenting the appearance of a solid lump of hard enamel it will be found to have swelled up into a soft, frothy mass, the evolution of acid fumes being evident in the discolouration and corrosion of the cork. The washed sample will probably at this time be found unchanged, or, at the most, there will be but a slight action upon the cork, showing that decomposition has commenced, but is proceeding far more slowly than in the other case; it is, however, only a matter of time. If the pasty mass be washed in lukewarm water, in order to remove the liberated acid, its former hard consistency returns, and if stored under water the decomposition proceeds much more slowly, and does reach such violence as to produce frothing.

Now there seems to be a direct connection between the decomposition of the nitro-glucose and its power of conferring density; and we are inclined to attribute its action in that direction solely to the rapidity of its decomposition, which we look upon as strictly analogous to the more tardy "ageing" of pyroxyline or collodion. M. de Pitteurs attributes the effect of extra density to a decomposition set up by light upon the nitro-gluco-argentic compomnd, which in turn produces a substance capable of reducing the silver forming the sensitive film. Without disputing the possibility of some such reducing action under a sufficiently prolonged exposure as in printing, we cannot think it exists in the case of an emulsion, or we think it would be accompanied by the phenomenon of self-development—at anyrate in the high lights of the picture. This, however, we have never found to be the case. We think the action is much more easily explained. The instability of the nitro-glucose favours the formation of a lower nitro-silver compound similar to, though possibly not identical with, the *nitrite*, which is known to favour density, and that a similar result ensues from the "ageing" of collodion, or from the employment of a "high-temperature" (and less stable or partially-decomposed) sample of pyroxyline.

M. de Pitteurs and others seem to infer that the peculiar properties of high-temperature cotton are due to the presence of nitro-glucose; but we fail to find any warrant that such is the case in respective conditions which have to be observed in the preparation of such pyroxyline and nitro-glucose respectively. High temperature and comparatively weak acids are necessary in the one case, the lowest temperature and the strongest possible acids in the other—conditions which cannot easily be made to assimilate.

MINERAL ACIDS IN THE IRON DEVELOPER.

It would be difficult to point out an exact time from which to date the change from pyrogallic acid to sulphate of iron for the development of negatives. Already a younger generation of photographers has arisen which has never had to do with the old pyro. development, with its intense blacks and transparent shadows, and that beautiful "bloom" upon the high lights which was so much prized; hence they cannot so fully appreciate the radical nature of the change that was effected when pyro. was finally banished for wet-plate negatives. They have received the iron developer from their teachers, and, owing, it may be, to there being less of the spirit of experimentalism among them than among the pioneers of the art, they seem, as far as present practice may show, likely to transmit it unaltered to posterity. We do not assert that there is a certainty of the present formulæ being supplemented by others; but we do think that various modifications might be introduced with benefit, and that without any variation from the principles involved in the present accepted mode of development.

At the present time a solution of sulphate of iron of all strengths with varying proportions of glacial acetic acid, from half-a-grain to two grains to each grain of iron, together with a little spirit, forms the stock solution used by ninety-nine out of a hundred photographers. It is occasionally varied by the substitution of iron and ammonia sulphate, and more rarely still by the addition of such organic matter as sugar, gelatine, &c.; but that is the full extent of the change.

We have been led to these reflections, and to the experiments we are about to detail, by a reference to an old formula given to us as a great secret years ago by a very expert operator when the value of iron for negatives was beginning to be spoken of. It was made by dissolving fifteen grains of iron, together with half-a-drachm of glacial acetic acid, in an ounce of water for one solution, and three grains of pyro. and the same quantity of glacial acetic acid as in the iron solution for a second solution. In developing, ten drops of the second solution were mixed with half-an-ounce of the first; and for intensification ten drops of the iron solution were mixed with half-an-ounce of the pyro. mixture, and silver nitrate as usual—a very curious mixture, our readers will say; but we do not hesitate to assert that there were negatives produced by its aid which are unsurpassed at the present day.

Our next notes referred to the formula employed by one of the foremost professional men of a dozen or two years ago. The formula was—

Sulphate of iron	6 grains.
Glacial acetic acid	10 minims.
Sulphuric acid	2 drops.

The gentleman referred to was *facile princeps* of *carte* workers in his time, and his negatives were marvels of cleanliness of working and of gradation in the shadows. But who at the present time ever hears of the employment of sulphuric acid except for ferrotypes, *et hoc genus omnes ?*

As we further could not call to mind any exhaustive accounts of trials of the mineral acids to entirely replace the acetic, we determined to make a series of experiments to ascertain what, if any, disadvantages would be shown in their employment for wet collodion negatives.

The character of the precipitate in a test glass when nitrate of silver is added to a solution of iron varies, as is well known, according to the restraining acid present. With acetic acid it partakes of a brownish cast; with sulphuric acid the hue is lighter; and with nitric acid it is very decidedly whiter. This character, however, refers to the colour of the image by reflected light, and it will be found that their indications are not always comparable with those produced in a negative and examined by transmitted light.

Our trials with negatives were with varying proportions of nitric acid and sulphuric acid, with different strengths of iron solution and no acetic acid whatever. We made some score or two negatives, and we unhesitatingly state that the exposure required was not any more than would have been needed with the ordinary-accepted solution, and the character of the negative was very little different. The chief difference discernible was in the direction of density, the acetic acid developer giving a stronger negative than either the nitric or sulphuric acid; but the difference was not great, and no difficulty whatever was experienced in obtaining as much density as was required with the usual pyro. intensifier. We call attention to this—not on any account as a defect, but merely to put our readers on their guard against disappointment if they should feel inclined to try the new developer.

If we were asked what advantages the mineral acid developer possesses, we would reply that it is cheaper, and for travelling less bulky, and for comfort in working it is beyond comparison superior to the acetic developer, the pungent smell of which in a tent or in a close dark room being at times most offensive, while some samples of glacial acetic possess an irritating property which occasionally gives rise to most uncomfortable sensations.

It is our intention to continue our trials with this developer, and ascertain with repeated practice whether it may not be expected to possess such qualities as may justify the banishment of glacial acetic acid entirely from the practice of wet-plate development; and if, as we think likely, this happens we shall have one smell less in the dark room.

To those who do not care to employ a developer which does not give a full amount of density at the first application we would recommend the addition of half-a-grain of sugar or of a small quantity of gelatine, as described in a previous article a few months ago. By this means almost any amount of intensity may be obtained. If overmuch be not added we are inclined to think that the exposure will not be to any appreciable extent protracted.

We close our article by giving the two formulæ we employed with success:—

Sulphate of iron	20 grains.
Nitric acid	5 minims.
Methylated spirits of wine	20 „

Sulphate of iron	20 grains.
Sulphuric acid	5 minims.
Spirits of wine	20 „

These were used precisely in the manner that the ordinary developer with acetic acid is employed.

RECENT PATENTS.

No. XVI.—HUGHES'S TRIPLEXICON.

When last we drew attention to the improvements introduced by Mr. W. C. Hughes into the magic lantern, by which he has been enabled to produce a light of extraordinary purity and intensity, we intimated our intention of returning to the subject as soon as by the publication of the specification of his patent we should be placed in a position to describe in detail the means employed in effecting such intensity of illumination. Speaking on this subject in general terms, we attach great importance to such improvements as those introduced by Mr. Hughes, because every effort to supersede the oxyhydrogen light in the magic lantern is deserving of the highest commendation. When such efforts are attended by the degree of success we have seen achieved by Mr. Hughes then there is the greater cause for congratulation. With these prefatory observations we allow Mr. Hughes to speak for himself through the medium of his completed specification:—

The triplexicon lantern lamp is a new and improved form of lamp, having three distinct wicks and separate racks and pinions, arranged in such a manner and having such dimensions in construction and shape as to cause proper and perfect combustion, both for magic lanterns, the public streets, rooms, halls, ships, lighthouses, &c.

It has long since become apparent that to get the proper combustion of three separate wicks, so as to make them burn with anything like certainty and effect, would require a vast amount of ingenuity and skill. This, however, is done by regulating to a nicety the admission of the proper amount of air in such quantities as to support combustion without losing any of the whiteness of the light or flame. I am enabled, however, by my arrangements to produce such great intensity of light for the purposes above mentioned.

In speaking of its application, in this my final specification, to the magic lantern it is proper to explain very clearly the reasons for my various regulations, plans, shapes, and dimensions, as well as the construction of the "triplexicon" lamp itself, as hereafter described.

In the first place, it is very essential that the wicks for magic lanterns and the orifice of the wick tubes should be shaped and arranged in certain positions so as to be compatible with the absorbing power of a lantern condenser, so that few rays of light may be lost by it. It has been the aim of magic lantern manufacturers generally for years past to obtain a properly-illuminated and bright disc on the screen. One of the essential features for the accomplishment of this object is the size of the flames themselves, and the position and shape the wicks should necessarily occupy. For example, there may be placed at the back or front of a lantern condenser ever so concentrated a light, at either the top, bottom, or sides, and still scarcely any result will be perceptible; but adjust the same light at a proper focal distance and in the centre, then nearly all the rays are absorbed, provided the flame or flames are placed in straight lines, or partially curved from the lens. What is meant is this:—Suppose a flat flame is placed strictly parallel with the condenser, only that portion of the flame which comes immediately within the absorbing radius of the same will produce any advantageous result, because it is only the centre part of the lens that collects really the rays of light. But reverse the lamp, by presenting the edges of the flames to the condenser, and you get quite a different effect. Thus the condenser absorbs more light longitudinally than in a parallel direction. Therefore in a lamp of this kind it is very essential to study these points. This ultimatum has been obtained by the introduction of wicks placed in straight lines to the condenser, as in the "sciopticon" and lamps of similar construction.

In the application of three wicks for the same purpose the like principle is to be adopted; but to obtain in this case the concentrated light, the width of the wicks, as well as their various shapes, together with their proper combustion, must be of vital importance.

If three wicks are placed very close together, no matter in what position, a very poor light would be obtained, on account of sufficient air not being allowed to pass between the wicks, because of their closeness to each other; and, on the other hand, if placed too wide apart they would certainly lose their power for transmitting light to the screen, a large quantity of the outside rays being lost.

Suppose a large argand burner (say two inches in diameter) is placed in a magic lantern, a great deal of heat would be generated, adding but very little more light to the screen, on account of the light from the front and back being caught by the lens, while the greater part of it on the lateral sides would be lost, and on the whole give but little more brilliancy to the screen than a one-inch argand burner. Hence it is that the oxyhydrogen lime light is so valuable, because of the concentration of the light at a given point in magic lantern use.

Next comes the relation of these three wicks to each other, and to the condenser itself.

The object I have in view is to get the greatest amount of light possible. This can alone be obtained from the width of the burning edges of the wicks being placed in suitable positions, and having such internal and external arrangements as to carry off the hot air as much as possible. Therefore the width of the wicks for magic lanterns of three-and-a-half or four-inch condensers should not be less than one inch and five-eighths, but more if necessary, up to eight or ten inches.

In a magic lantern with three-and-a-half or four-inch condensers my standard size of the wicks is not less than two inches wide, although I claim to use them as low as one inch and five-eighths in condensers three and a-half to four inches in diameter, and wider if necessary.

It is evident that a condenser absorbs more rays of light when placed in such a position as to catch them edgeways, therefore the wider the wicks (consistent with the other arrangements) the greater must be the intensity of the light, and a more brilliantly-lit-up disc will be the consequence. The condenser at the focal distance will absorb or take in any amount of concentrated light. If three wicks are arranged (say three-quarters of an inch wide) for use in a magic lantern, what would be the result? No more effect than an ordinary light would give. But make them two inches, and you get a wonderfully-increased light, and so on, if larger, *cæteris paribus*. In this part of my invention I adhere strictly to this point, viz., that no three-wick magic lantern lamp should have wicks less than one inch and five-eighths wide, and increased if necessary to eight or ten inches, according (as before mentioned) to the size of the magic lantern condenser; but in streets, rooms, halls, shops, lighthouses, &c., they, when curved or bent (one or more of them), may be used in sizes varying from half-an-inch to eight or ten inches wide.

The wicks should be placed in the following positions in relation to the condenser, so that it absorbs as much of the light as possible, as well as to produce a properly-illuminated disc without aberration or shadow:—

In the first place, to produce these results the wicks should be situated thus, namely:—The centre wick straight, while the two side ones curve, as shown in *fig.* 10 of the drawings.

In the second place, the centre wick is straight and the two side ones each at an angle, as shown in *fig.* 11.

In the third place, the centre wick is straight, the side ones forming part of a circle or egg shape (as in *fig.* 12), also arranged in divisions, according to the various widths given in the drawings.

Either of the three triple-shaped wicks, shown by *figs.* 10, 11, and 12, will produce the same effect on the screen. Now, although the wick tubes take the above shape at their orifice for magic lantern purposes, as before mentioned, they are equally as powerful for rooms, streets, lighthouses, &c.

The whiteness and intensity of the flame is also determined by the proper and well-regulated amount of air being admitted, and by the proper arrangements underneath, between and above the perforated plates and that which surrounds the flames. This is very important, and the brilliancy of light produced by the arrangement of parts as to size and dimensions of the various fittings and parts forming the lamp, as shown by the drawings. As it is absolutely necessary to have properly-arranged air-draughts underneath the flames, it is also imperative to have the required quantity of air admitted round about and above them. This is done externally by the size of the combustion chambers, which are shaped by my invention in more forms than one suitable to the various sizes of the flames. For instance: if a set of wicks two inches wide will take a chamber four inches in diameter, a wick three inches wide will take one six inches in diameter, the same standard being observed with regard to the size of the fittings, and soforth, provided they have the arrangements I have made for their proper combustion. The flames, too, must rise steadily to a proper height and burn with great whiteness, which can only be guaranteed by my calculated constructions, as before described. In the combustion chambers, covering the flames of the ordinary two-wick lamps on the "sciopticon" principle, they have at either end two glass plates. These chambers are made of metal, and form part of the chimney by which the hot air escapes.

In my invention for covering the three wicks I place at each end, instead of glass, very finely-cut plates of mica or talc, or the condenser itself at one end, if necessary. My reason for so doing is that the ordinary window glass will not stand the heat, which has always been a serious defect even in the two-wick lamps, and would be much more so in lamps of three wicks; but I do not confine myself to the use of this form of chamber when the lamps are used in magic lanterns, but to the other parts of my invention which apply to its use in the streets, shops, halls, rooms, lighthouses, &c. The combustion chamber consists of an annealed glass, square, circular, conical, polygonal, or other convenient shape suitable for the purpose for which it is required; but I prefer for present use the conical annealed glass chamber, four inches in diameter at the bottom, three inches and one-eighth at the top, and three inches and three-quarters deep, and hollow right through like a cylinder, the bottom of which rests on the ground plate (*figs.* 13 and 15), and is covered over by a metal conical-shaped frame or cap (as in *fig.* 9), the glass cylinder fitting loosely inside the same and with the long metal chimney (D, *fig.* 3), which fits round the collar of the metal cap and forms an entire and complete chamber. Two openings (*fig.* 9), back and front, allow the light to pass out at either side; a silver reflector (C, *fig.* 14), with movable piece A, is attached to the cover or top plate of lamp, and reflects the light to the condenser. This cap or metal frame rests entirely on the ground plate, and can be removed as a separate piece. The glass chamber (*fig.* 16) should be made of annealed blower glass of any of the shapes and sizes before mentioned. The outside frame or cap fitting to correspond with it may have as many openings as required to admit of light passing out in any direction; or in place thereof a metal cap resting on the top of the glass chamber may be applied, so proportioned and arranged as to leave a large area for light to pass out without any interruption, so as to support the chimney hereinbefore described.

The ground plate (*fig.* 13), which is circular, and on which rests the metal frame and glass chamber, has an arrangement (*fig.* 15) for letting in minimum quantities of air, if necessary, to feed the flames. The plan of this portion of my invention will be more fully described hereafter with reference to the drawings.

As before mentioned, common window glass will crack under ordinary circumstances, because it cannot be got very readily and properly annealed, and when placed, as it has to be, in direct communication with the heat coming from the three flames, two inches wide, scarcely a minute will pass without its being shattered; hence it is the blown annealed glass chambers will survive any amount of heat that may be brought to bear upon them during the combustion of the same. Moreover, in this form of chamber and connected chimney the hot air escapes without any intervention, which is of great moment when the lamp is placed in a confined space, while in the metal combustion chamber it collects and remains intensified, much to the detriment of surroundings.

(To be concluded in our next.)

It may be a moot point as to which has done the most towards the advancement of photography—photographic journalism or the formation of photographic societies; but there can be no two opinions that, but for these two forces, our art-science would not occupy the position it does today. Perseverance, if backed up by other necessary qualities, can do much; but genius, plodding on alone, is apt to travel in a groove which, except by accident, it cannot leave. Niepce and Daguerre formed examples of this. Talbot, more favoured by circumstances, widened his particular course until it became merged in the broader stream of general science, and nowadays processes are built up more by the association of different ideas than by the single efforts of individuals. *Tot homines, tot sententiæ* may be true enough; but even with societies we find a tendency on the part of the different members to run in one general groove, until the society as a body acquires much, if not all, of the character of an individual. Two of our leading provincial societies have, however, instituted a new order of things. In our last number we published a brief account of a joint excursion of the Manchester and Liverpool photographic societies, and now that the ice has been fairly broken we trust that the experiment will become an established system. Our metropolitan societies necessarily partake more of the cosmopolitan character than those in the provinces, no matter what may be the size and importance of the towns in which the latter may be located; but it is worthy of notice that each of the two we have mentioned—belonging, as they do, to the two principal commercial "centres" of the country—has acquired for itself a character of "individuality" scarcely equalled by any other similar body, however small. The representatives respectively of collodio-albumen and of collodio-bromide have, however, resolved on an attempt at mutual benefit, in which we heartily wish them success, and should like to see the same principle extended in other directions. Photographic societies are not all so fortunately situated locally as these two, and a day excursion is all too short for the purpose in view; still, we think, the obstacles in the way are not insurmountable. Few, we imagine, of real photographers do not allow themselves a few days "out with the camera" in the course of the year; and we think it not impossible that, by preconcerted arrangement, a large number of *individuals* from all parts of the country could find it convenient to meet at some picturesque centre, and devote a few days or a week to mutual improvement and pleasure combined. The communication of practical ideas is what we want and what we cannot get at the formal meetings of societies; while a national "conference" for purely scientific discussion is to our idea not only unnecessary but worse than useless. The socialising influence of companionable intercourse, untrammelled by any formality and aided by the pleasurable excitement of the holiday, would conduce more to the genial interchange of ideas than all the "ordinary meetings" of a session, to say nothing of the additional pleasure to be derived from personal acquaintances or friendships thus formed.

PRACTICAL INSTRUCTIONS IN MODERN PHOTO-MECHANICAL PRINTING METHODS.

Part I.—PHOTOLITHOGRAPHY.

I. Making the Negative.—One of the most important points in connection with the successful practice of photolithography is to secure a suitable negative, for without this no amount of careful manipulation will lead to satisfactory results. A negative for photolithography should possess only two grades; and the more nearly these approach to absolute opacity on the one hand and perfect transparency on the other hand so much easier will be the work of making a transfer. When a drawing or engraving consists of lines which are intense, all about equal in width, and not separated from each other by very fine white spaces, it is generally easy to obtain a satisfactory negative, notwithstanding the fact that the lines for reproduction may be very fine.

Let us take a more difficult case, and suppose that we have to reproduce a moderately-fine engraving containing not only clear, open lines, but also fine greyish lines, closely clustered together.

If the engraving have become stained, or have acquired a yellow tint from age, it may be necessary to clean and bleach it, and it is generally advisable to do this unless the yellowness or tint is very evenly spread over the surface of the paper. If, however, the tint on the engraving appear uniform to the eye, and a preliminary trial with a small collodionised plate shows that it is photographically uniform, it is generally better not to bleach the print before proceeding to take a negative of it. If, on the other hand, it be resolved to clean and bleach the engraving, it should first be soaked in slightly warm water for a few minutes, in order to soften the paper and to remove any products of decomposition which may be soluble in warm water. This having been done, it should be put into a mixture of one part of commercial hydrochloric acid and forty parts of water, and when the acid has had time to thoroughly penetrate the print it should be laid on a sheet of plate glass and well rinsed with the acid, which must be poured on it over and over again. During this rinsing with dilute hydrochloric acid a very gentle friction may be cautiously applied to the surface of the print by means of a camel's-hair brush. After a thorough rinsing in water the engraving is next placed in a dish containing a solution of the so-called chloride of lime, prepared by dissolving one part of the commercial article (bleaching powder) in one hundred parts of water, and filtering the solution. As soon as this liquor has thoroughly penetrated the paper, gradual additions of hydrochloric acid may be made in order to liberate the energetically-bleaching oxides of chlorine. These additions of acid should be made carefully—not more than a few drops of acid being added at a time—and the acid be thoroughly mixed with the bath before the engraving is reimmersed. It is very much better to bleach the print slowly than to hasten matters by an undue addition of acid to the bleaching bath. The print having been sufficiently whitened or bleached, it must next be washed in three or four changes of water; but this washing is generally insufficient to remove all traces of the bleaching agent from the fibres of the paper, and as any remaining traces of free chlorine or free oxides of chlorine would lead to the destruction of the paper it is important to give the bleached engraving a final soaking in a solution of sodium hyposulphite containing about one per cent. of the salt. Sodium hyposulphite is a most energetic "antichlor," and is largely used for removing the last traces of chlorine from bleached goods, as silver printers find to their cost when they use mounts which contain this salt. The photo-mechanical printer has no reason to fear sodium hyposulphite, although to the silver printer it is a very sword of Damocles.

Having thus cleaned and bleached the engraving, the next thing is to mount it on a piece of thin patent glass plate. In order to do this select a piece of glass free from defects and a little larger than the print; put this into a dish of clean water, and then immerse the engraving, face downwards, taking care to avoid air-bubbles. Now adjust the engraving to the middle of the glass plate, and, while keeping it in position with the fingers, lift out the plate with the print on it. If this be properly done, the glass and the face of the engraving will only be separated by a thin layer of water free from air-bubbles, and this layer of water is next removed as follows:—The glass bearing the engraving having been placed on a horizontal board a sheet of wet paper is laid over all, and the water is forced out by scraping the surface with the india-rubber edge of a squeegee, this useful instrument consisting of a strip of india-rubber mounted between two strips of wood not quite so broad as the india-rubber. The excess of water having been thus removed the next step is to strip off the outer layer of paper, which was only intended to protect the back of the engraving from the slight grinding action of the squeegee. This is done by turning back one corner of the paper until it is nearly parallel with the rest of the sheet, and gently stripping it off by a steady pull. Under these circumstances the print remains adherent to the glass, where it should be allowed to dry slowly. Generally it remains on the glass when dry, and when this is the case it is in the best possible condition for copying, being perfectly flat and free from folds; if, on the other hand, it should separate from the glass on drying, it is still in good condition for copying, it being in this case merely necessary to clamp it between two glass plates.

It is generally advisable to mount any engraving which is to be copied on a glass plate as described above, as it is impossible to obtain a good copy of any printed matter unless perfect flatness be secured. The glass plate bearing the engraving can now be fixed to the black board of the copying camera by means of drawing-pins placed round its edge, and immediately behind the engraving should be placed a sheet of white paper, in order to prevent any possible degradation of tint from a partial transparentness of the engraving; but this paper doublet should not be larger than the print to be copied.

Care must be taken to illuminate the object as uniformly as possible, and it is generally easiest to do this out of doors. In order to prevent any possibility of light being reflected from the surface of the glass cover into the lens, a screen rather larger than the object to be copied should be placed immediately in front of the camera, and the lens must look through a hole cut in this screen. It is scarcely necessary to remark that the axis of the lens should be at right angles to the print and sensitive plate, otherwise an unsightly distortion will result; but, generally speaking, the mechanical arrangements of the copying camera provide for this.

The most convenient lens to employ is the portable symmetrical, as it gives a very evenly-illuminated field together with straight lines, and it covers a large field in proportion to its focus, thus avoiding an inordinate length of the copying camera.

In copying photolithography one will naturally use a bath which is free from any tendency to fog, and a collodion which has been iodised some time; but a very old and degenerated collodion must be avoided, or the film may become granular during intensification with mercury. A full exposure must be given, otherwise the fine lines will be lost; and after development with a weak iron developer the negative should be fixed with cyanide and then well washed by soaking in several changes of water.

At this stage a careful examination of the negative should be made. In the first place, notice whether the lighting of the subject has been uniform, and whether the deposit of silver on those parts which correspond to the whites of the original is fairly equal all over. If there be any fault in either of these respects it is best not to waste any more time over the plate, but to take another negative at once.

Next place a black cloth behind the negative, and carefully examine the lines to ascertain how far they are free from deposited silver. If the broad and clearly-defined lines of the engraving are not perfectly free from every trace of cloudiness reject the negative; but in taking another do not so reduce the exposure as to lose the fine lines, it being generally better to lower the strength of the developer than to unduly lessen the exposure. In most cases the finest lines of the engraving will not be represented in the negative by perfectly clear glass, neither will the fine spaces between these lines be as dense as the general ground of the negative. Several causes tend to this result. In the first place, it is seldom that the very fine lines of an engraving are clear and intense, an inspection with a magnifying glass generally showing them as greyish, broken, and ill-defined; moreover, the whites between these lines are in most cases tinted by the ink, and are consequently less pure than the general ground of the engraving. Any slight vibration on the part of the camera tells most on these fine lines and their intervening spaces, tending to mar the transparency of the former and to reduce the opacity of the latter. The evil effects of vibration may be, to a great extent, got rid of by suspending the camera and copying-frame (these being, of course, firmly united together) by means of cords, which should radiate outwards towards the roof of the building so as to lessen the tendency of the apparatus to swing.

When the best possible negative has been obtained and has been fixed with cyanide of potassium it must be intensified. In the case of a negative from a fine engraving this is best done by immersing it in a saturated solution of corrosive sublimate (mercuric chloride), where it should remain until the deposit becomes quite white, a period of five or ten minutes being usually sufficient for this. After a rinse in water it is next transferred to a solution of potassium iodide containing one grain of the salt to each ounce. Here the whitened deposit becomes rapidly yellow, and when the yellow tint has penetrated the film the negative is removed, rinsed, dried, and varnished.

If the negative be used in its present state for making a photo-lithographic transfer it will be found that an exposure which is sufficient for the broad clear lines is insufficient for those which are slightly veiled or fogged; and in order to render it practicable to secure the whole of the subject the negative must be shaded in the transparent parts. This is best done by fixing a sheet of fine tracing-paper on the back of the negative and shading on this with black-lead applied by means of a stump. Before fixing the tracing-paper on the negative it is best to damp it by laying it between moist sheets of blotting-paper, and when slightly damped in this way it is applied to the back of the negative, which should have been gummed round the edges. As the paper dries it becomes quite tense, and when dry it should be placed on an easel and shaded with the blacklead until all the lines appear about equal in transparency.

The success of this operation is best tested by exposing a piece of ordinary sensitive albumenised paper under the prepared negative, and noticing if the whole of the subject prints equally and simultaneously. If any part print more rapidly than the rest it must be shaded accordingly, and if any part be noticed to be slow in printing a little varnish should be applied to the tracing-paper at the back of this part, or in some cases a piece of the tracing-paper may be cut out with a knife. The foregoing, or some other method of shading the negative, originally advocated by Professor Husnik, should never be neglected when fine engravings have to be reproduced by photo-lithography. Coarse subjects—such as ordinary typographic matter reproduced the same size—do not require this treatment, as it is easy to obtain negatives of these that shall be perfectly clear in the transparent parts and possess any required density in the opaque parts. In such cases it is generally best to intensify with pyro. and silver after fixing, and then to treat with mercuric chloride, so as to obtain an extreme degree of density. The yellow negatives obtained by mercuric intensification become rather lighter in colour by exposure to light; so it is best to put them away in a shaded place. The short exposures required for making transfers do not injure them.

The negative having been thus secured, the next operation is to obtain a transfer or print in fatty ink by the method to be described in the next chapter. T. Bolas, F.C.S.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

In common, doubtless, with many readers of The British Journal of Photography, I have been much shocked at the account given, on the authority of the *Observer*, of the death of Professor Fischer from having incautiously tasted a mixture of cyanide of potassium (in solution, apparently) and chloride of ammonia, or some other substance with which the poisonous body was diluted. But upon reading the details very carefully I am rather inclined to think that there has been some misstatement made in connection with the alleged event. I have manufactured a good deal of cyanide of potassium during my life, and I have purchased samples of almost every kind offered for sale, at prices ranging from fourteenpence to six shillings per pound, and I assert that it is *not* "a white powder resembling flour or chalk," that a fragment "almost imperceptible to the eye" will *not* cause "instantaneous death," and that cyanide of potassium, contrary to the statement in the *Observer*, *is* volatile in the sense of its giving off deadly emanations. I incline to the belief that Professor Fischer could not possibly have acted in such an indiscreet manner as to taste, himself, a solution of medicated cyanide in order to demonstrate to an assistant its innocent nature. If he had done so he would have furnished an instance of foolhardiness such as the world has never before heard of. But cyanide of potassium does *not* kill instantaneously, the *Observer* notwithstanding; and even if the Professor had taken a much larger quantity than he could have imbibed in the manner described, he, chemist as he was, must have known that there are several antidotes to this poison which, if the event really did occur in his laboratory, must have been stored in plenty on shelves beside him. If he found that he was really "in for it" and was desirous of escaping from the consequences, he would have lost no time in swallowing an infallible antidote with which he, as an experimentalist in the toxological effects of cyanide, must have been quite familiar, and which is present in every laboratory. I allude to protosulphate of iron, which, with the addition of a little persulphate, immediately converts the cyanide of potassium in the stomach into Prussian blue, which is a harmless compound. I do not desire to insinuate that Professor Fischer was not poisoned accidentally; but, as the writer in the *Observer* has made loose statements in some matters connected with the unfortunate event, it is not impossible that his statements may be equally untrustworthy as regards the principal facts.

The death of Mr. Thomas Grubb is another reminder of the passing away of the veterans in what has been so well designated the "art-science" of photography. Mr. Grubb's forte lay in writing most lucidly upon photographic optics—a branch in which he was singularly well calculated to assume a high position as an exponent. I recollect spending an evening in his company when he last visited London, and was struck by the facile manner in which he conversed upon those particular departments of photographic optics known respectively as the oblique pencil and depth of definition—subjects which, it need scarcely be observed, are not connected with each other. Of all those (and they were numerous) who had occasion to take to task the late Mr. Sutton for errors of diction there was no one who did it with such weight as Mr. Grubb, and the weight was none the less felt because its administration was gently made.

Observing that the subject of stereoscopic transparencies is ever and anon coming up to the surface, I would suggest, to such of my brethren as possess the knowledge, how very desirable it would be if some competent writer would give us an exhaustive article on the method of producing transparencies by the negative albumen process. Such an article would be read with great avidity. There is in the transparencies of Ferrier and Soulier and their successors a certain charm which in a measure takes captive the senses of the spectator. There is transparence even in the deepest shadows, and this, coupled with the peculiarly rich tone they possess, renders them so much finer than collodion pictures that it is no wonder some connoisseurs prefer giving half-a-guinea for one such work of art than half-a-crown for a collodion picture. It is said—and I believe with some truth—that notwithstanding all that has been written on the albumen process the real method of its application to the production of transparencies has been closely guarded as a secret. I am aware of one gentleman under whose eye these lines will fall, and who is quite conversant with the details of the Ferrier method. Perhaps he will kindly respond to the hint I have here so plainly given.

Speaking to a friend lately concerning the recent meeting of the British Association in Dublin, he told me that his daughter was present in the Geographical Section for nearly an hour during the reading of Captain Waterhouse's paper, and she put it down as exceedingly "dry." From her point of view this is no doubt correct, just as the discussion of a topic connected with millinery or the making of costumes, *et hoc genus omne*, by a lady would be "dry" to one of the sterner sex. Speaking, however, as one to whom the subject treated is not quite unknown, I must place on record the great satisfaction with which I read from week to week Captain Waterhouse's valuable compendium of cartographic processes, which, taken in connection with what he has already written on the same subject, is by far the most valuable work of the kind that has yet appeared. However, I am still bound to admit that there is every excuse for a young lady thinking such a subject a rather dry one.

(To be continued.)

NOTES FROM AMERICA.

A Cure for Blistered Paper.—Regulating the Light in Studios.—Burnishing Prints.—The English Photographs in the French Exhibition.

Only a fortnight has elapsed since we spoke of the connection between blisters and a very dry condition of the albumenised paper upon which such blisters appeared. Some observations by Mr. A. Hesler, in the last number of the *Philadelphia Photographer*, tend to confirm what we then said. Mr. Hesler, however, goes farther back with regard to the preparation of paper than we did. We recommended the placing of the paper in a rather damp atmosphere previous to exciting it; he, on the other hand, recommends similar treatment in connection with its being albumenised. Taking the liberty of suppressing a liberal rendering of italics in Mr. Hesler's remarks we give them as follow:—

In looking over our valued friend Vogel's letter in your July number, his remarks on blisters remind me of what I said on that point in last *Mosaics*. His remarks confirm what I then said, viz., that the main cause of blisters—those damaging blisters—lies at the door of the albumenisers; and I refer to it now in hope that their attention may be forcibly called to the matter. I do know that to take plain paper (have it very dry and hard) and lay it on the albumen just long enough to make a coating on the said paper, will give to the poor photographer a paper that will blister in spite of all the blister-cures ever invented. I think I hear a smile come from friend Clemons, or the famous S. & M., across the briny deep, as they say, "Teach your granna how to take snuff, will you?" Yet I do not know that albumen applied to paper previously dampened, and allowed to lie on the albumen sufficiently long as to absorb the albumen into the fibre, that such paper will stand almost any kind of treatment and not blister. Try it, ye albumenisers, and aid in removing one of the damaging trials of us poor photographers.

The same writer has some remarks in reply to a question in which the experience of those who use tracing-cloth in excluding the light from studios is asked for. He says:—

I am using such screens, attached to spring rollers at the upper edge of the skylight, and find them just the thing. Under these I have blue opaque curtains. The upper ones keep out the sun, and are rolled up or down in a moment. The blue opaque cuts off the light from any part I choose. My skylight room is thirty-five feet long, east and west, by twenty wide. The light is nineteen feet long, east and west, by fourteen wide, facing north; lower edge seven and a-half feet from floor, with side light three and a-half feet wide by nineteen long, on which the top light rests. The upper side of the light is fourteen feet from the floor. Under this light I make children's pictures in less time than you can say "scat," and groups as soon as you can say "Jack Robinson."

Mr. Irving Saunders, in the same journal, imparts as follows, his experience in the burnishing of prints:—

About two years since I was very much troubled with very fine scratches in burnishing, different from those caused by roughness of the burnishing tool. Another proof that the cause lay outside of the burnisher was that two or three, perhaps, would burnish all right, then one scratched badly, next all right, and so on through the lot. I asked several the cause, Mr. Bass among the number, but none gave me any satisfactory reason. I finally found the cause to be that the prints were allowed to get too dry before burnishing, and the remedy I used was as follows:—After mounting, the moisture should not get off the prints before burnishing. As soon as the prints begin to curl toward the picture I pack them one upon another. My first plan was to place them in the cellar until ready to spot; while doing this I only expose one print at a time, keeping them packed. After spotting, lubricate with soap and alcohol (I find wax, spermaceti, &c., to give, in my experience, a veiled appearance), and spread out in the cellar upon something clean. I use a cloth stretched upon a small frame, where they should remain until ready to burnish. A superior burnish will result if they can remain twelve hours after lubricating, as directed, spread in the cellar. I have since made another improvement, substituting for the cellar a tight tin box, which I had made large enough to hold my prints flat. Care must be taken not to have the prints too damp. I run them through, lightly, twice across the burnishing tool, until all are through, then run about four times again, commencing with the first. I run the first thin.

It is always well that we should "see oursels as others see us." To this end we shall give what has been said of the English and other departments of the International Exhibition now open in Paris by a correspondent of the *Philadelphia Photographer*. He says:—

The English exhibition I think I have seen beaten in Conduit-street, London. Messrs. Elliott and Fry's enlargements; Mr. Vanderweyde's pictures by electric light; Mr. Bedford's views; Mr. Vernon Heath's large landscapes, 36 × 39 inches; Mr. Robinson's always attractive pictures; Mr. Warnerke's excellent film-pictures on fabrics; Mr. Slingsby's one exquisite interior view of a room; Mr. England's always fine views; some others from Brighton (where Mayor Mayall lives), by Mr. Boucher; some very fine productions in carbon by the Autotype Company (strange there were no other such from London), and a few others, made up the disappointing British exhibition—not forgetting, however, that king of landscape photographers, Payne Jennings. His work is superb, and if landscaping was more in vogue he would go up on our shoulders, as Salomon did ten years ago. He is an artist in every sense. Each one of his 10 × 12 views is a wondrous masterpiece. Hare and Ross and Dallmeyer look after the apparatus and optical departments. Notman, of Montreal, exhibits a few of his compositions—new here, perhaps, but not to us. No one else seems to do much in them. Norway, Sweden, Spain, Italy, and a few other foreign countries made a feeble attempt to exhibit, but I saw no novelties among them. The Italian Government exhibited about one hundred very pretty views of buildings, which made me sigh to see Italy again. Some Hungarian pictures are superb. And now we come to the United States department. What is shown here is not large in quantity, but generally is equal in quality to any photography on exhibition from any part of the world.

SWITZERLAND FROM A PHOTOGRAPHIC POINT OF VIEW.

[A communication to the Liverpool Amateur Photographic Association.]

Applications are occasionally made to me for information on the subject of Switzerland, with special reference to the needs and requirements of amateur photographers. Having lately returned from my twelfth visit to the Alps with my camera, I have thought that possibly the jotting down of a few notes by the way may be of use to others, and not entirely devoid of interest for our meeting tonight.

In the first place, a few words on the subject of preliminary preparations. It is hardly necessary to say that the all-important matter here is the production of the films and plates upon which those exquisite negatives which fond fancy imagines are to be developed. In this respect my misfortunes of this year have taught me very emphatically an exceedingly obvious, but nevertheless useful, lesson, viz., never to attempt a process with which, in all its details, one is not thoroughly acquainted. I had determined to take with me three cameras, and to use collodio-bromide plates in the larger of the three, my own films in the scenograph, and gelatino-beer in the quarter-plate camera. Accordingly I invested in a large bottle of collodio-bromide emulsion, and coated three dozen 9 × 7 plates. On trying a couple of these (the first and last of the batch) I found them hopelessly infected with an ailment which I had before become acquainted with in some commercial dry plates, and which an adept, whom I then consulted, informed me betokened "something wrong with the pyroxyline." The surface was covered with a mottled appearance, which ruined the picture, and left me no resource but to wash off all the films and try something else.

There next recurred to my memory a glowing description I had read somewhere of the beauty and perfection of an adaptation of the coffee process to the special requirements of Alpine scenery. Accordingly, having a large Winchester of bath solution which was worn out, and gave streaks in the direction of the dip, I sent this to the refiners', and ordered a new bath in its place. On the arrival of the latter I found myself within three days of starting, and therefore I worked hard and prepared a most promising batch of plates by this admirable process. The next morning I hastened to realise the value of my treasures. Alas! however, I speedily found that my friend the tradesman had merely filtered my old bath and returned it to me in its original condition. Every plate was hopelessly streaked with my old enemies.

There was nothing for it now but to wash the glass once more, and fall back upon a process upon which I could depend. The weather was too hot and the time too short to enable me to make a gelatine emulsion, so I telegraphed to Mr. Kennett for pellicle. I received a supply next morning, and by nightfall had all preparations completed once again for the next day's start. My films and small plates had been ready for weeks, and, with the exception of the former, fully sustained the character of the gelatine process for reliability. One hundred and thirty-nine plates were exposed on this tour, and one hundred and thirty-seven good negatives were the result, two having been spoilt by careless double exposures.

"How shall we get there?" is a question full of interest to every would-be Swiss tourist, and specially so to the photographer. My own practice and advice to others is to get the dreadful journey over as soon as possible, and make as few halts as convenient upon the way. Nothing, I think, in the way of scenery should tempt the traveller to unpack his cameras until he reaches his goal, unless both time and the supply of plates are unusually abundant. But the sturdiest and most ardent of photographers would hardly feel equal to one fell swoop upon the Alps from the point of touching the shores of the continent, and therefore a convenient resting-place, for one night at least, is a desideratum. The choice should, I think, fall upon a town in which there are good architectural subjects to be found for an early morning campaign; and when Belgium is selected as the point of departure for the long journey, Cologne, Frankfort, or Heidelberg are equally convenient as resting-places, and equally full of subjects of the right kind.

The best and cheapest route of all is that to Bale direct, by way of Antwerp, Brussels, Luxemburg, Metz, and Strasburg. As a midway halting-place by this route Treves occurs very conveniently. It is close to Luxemburg, and abounds with Roman remains of the greatest magnificence. The Porta Nigra, the ruined baths, and the superb Basilica will all prove irresistible temptations, and the town and banks of the Moselle are so full of pictures *in posse* as to render it difficult to avoid a constant employment of the camera in order to secure them *in esse.* My advice, however, to any who care to follow it would be—to arrive in Antwerp early in the morning, and secure negatives, *ad libitum*, of the Cathedral, the quaint old houses in the square, and just one canal scene near the quay. The one o'clock train gives time in Brussels for dinner and the exposure of a few plates upon the Town Hall, and, possibly, St. Gudule. But the latter is not a good subject, from the fact that the ground slopes rapidly down from the platform upon which the church stands.

Some of the people in Brussels exhibit a marked partiality for cameras. A half-plate apparatus of mine, with six double dark slides, was deposited for a few minutes on the platform, and disappeared mysteriously. Twelve beautiful plates were thus lost to me, and I much fear that their present owner will either fail to appreciate their value, or else be somewhat deficient in his knowledge of the requirements of gelatine plates.

At seven o'clock, p.m., a train leaves for Bale; and, if a good day's work has been done with the camera, and a good dinner devoured in the evening, the traveller will fall cosily to sleep, and, in spite of a few interruptions for the inspection of tickets, will "sleep the sleep of the just," and wake up for breakfast at nine a.m. in Bale. Six plates will prove an ample allowance here in the dark slide, though, possibly, not so on the breakfast table at the Trois Rois. The bridge and Rhine, the Cathedral front and terrace, and an old gateway tower will wellnigh exhaust the subjects of the first class.

From Bale decidedly the best route for those who are eager for pictures is a short detour to Neuhausen and the falls of the Rhine, and so to Lucerne. Although the height of the fall is only ninety feet, it is certainly the most impressive fall in Europe. There is a rock in the very centre of the boiling surges on the brink of the final plunge of the water to which there is safe and easy access from below. This position, however, is not a favourable one for a dry process, since both the photographer and his plates become unmistakably "wet" in a very few minutes. A point can be reached on the Schaffhausen side, from which a view may be taken of the rapids above and of the water on the verge of its descent, and a very fine picture it makes. The visitor to Lucerne ought not to be content with the ordinary stereotyped views of the place and neighbourhood. He should penetrate into the back streets and along the water side in the old town, and he will find many an old house reflected in the stream, which will amply repay him for his trouble.

My object this year was to get away from the rushing flood of tourists, and yet find myself in the midst of scenes which would yield me fine pictures. Accordingly, I determined to explore the Val d'Anniviers—one of the lateral valleys stretching southwards towards Italy from the valley of the Rhone. We halted for a day at Fribourg, as being conveniently midway between Bale and our destination. The town with its gorges, bridges, and organ delighted us all exceedingly. A compensating discomfort occurred in the extravagance of the charges in the bill at the Zahringer Hof; but I found Fribourg exceedingly rich in subjects for negatives, and obtained many good pictures. A short stay at Chillon was made with satisfactory photographic results, and then a journey—tedious only from the lazy crawling of the train—took us past the bridge of St. Maurice (said to be the finest view in the world), past Martigny and its routes to Chamounix and St. Bernard, to Sierre. Here we packed our baggage in a narrow cart and trudged along to Vissoie, the capital of the Val d'Anniviers. The road gently ascends for a mile or two along the Rhone valley heights, affording magnificent views of the Bernese Oberland and the valleys leading up to the Gemmi and the Diablerets.

On turning the corner, at a considerable height above the Rhone, the whole extent of the Val d'Anniviers, as far as Vissoie, lay before us. At our feet was an inaccessible gorge, through which the Navisanche finds its way to the Rhone; thence the valley stretched up between the mountains, closed in at its upper end by the magnificent Lo Besso and its snowy neighbours, the Gabel Horn and the Dent Blanche. The walk to Vissoie is about ten miles, along an excellent but very narrow road, at every turn of which some new glory of rock, or peak, or cascade, presented itself in maiden beauty to the camera. The gorge of the Pontis on this road reminded me of the Via Mala on the Splugen. It is quite as startling in the glory of its precipices and the abundance of its tunnelled galleries and foaming waterfalls. I had ordered the carrier to halt with the large camera at what he considered the finest "bit" on the road. Accordingly I got a good picture of one of the Pontis scenes.

We found Vissoie the very perfection of a resting-place. The village is high up on the mountains, the hotel most comfortable and most primitive in prices, the village exceedingly quaint and Swiss, and the scenery on all sides requiring adjectives of the most superlative degree to describe it. There were only two drawbacks to our complete felicity at Vissoie—one, that the bread came from the Rhone valley but once a week, and on the second day became sour and uneatable; the other that the landlord had but one joke, which he administered to us daily at dinner. The valley extends beyond Vissoie to a little village eight miles off—Zinal by name. At this place the happy photographer may live most enjoyably for four francs fifty centimes per day, and has within easy reach glacier scenery and alpine peaks and passes of the highest order of difficulty and danger. The best points of view here are from the Arpitetta Alp, over the slopes of the Weisshorn; from the Caban at Mountet, commanding the superb Zinal glazier, with a wondrous amphitheatre of snow-peaks; and the Roc-Noir, opposite to the strange but stupendous pyramid of black granite, Lo Besso.

At Zinal I found inscribed in the visitors' book the name of a member of our society, Mr. Pendlebury; but I do not think he can have had his photographic *impedimenta* with him when he made his visit, judging from the excitement which mine created among the natives, and from the careful skill with which my porter thrice dropped my heaviest camera from his shoulder to the stones.

Several passes descend into the Val d'Anniviers, near Vissoie. By one of these we had intended crossing into the Turtman Thal, after ascending Bella Tola, but the extent and depth of the snow rendered this out of the question, and we therefore retraced our steps to the Rhone Valley, and proceeded thence by Visp and St. Niklaus to Zermatt.

I have mentioned all these particulars of Vissoie and its neighbourhood in the hope that I may persuade some brother photographers to explore its glories, and gladden the heart of mine host of the hotel by their purses and presence.

There are three classes of subjects in which Swiss scenery excels, viz., snow and ice, picturesque *châlets* and villages, and rocks and rivulets. Now these are all readily obtainable in the Val d'Anniviers; and, on the other hand, there are no beggars, no *chamois-showmen*, no performers upon those marvellously-excruciating instruments which one comes across so often in the Oberland, and no demands are made for "baksheesh." You may rouse a thousand echoes everywhere by merely lifting your voice, but no cannon will startle you into deafness or extract from your pocket the grudged half-franc.

I have not reaped the full benefit I expected from the use of my films. The slide and focussing-screen answered admirably as regards portability and trustworthiness; but my batch was unsatisfactory, and I brought home but few pictures compared with the number of those upon glass. The focussing-slide gave me useful evidence of its superiority to glass. Especially was this the case on the Gorner Grat—some ten thousand feet above the nearest glacier. The slide rolled down over a small precipice (as focussing slides usually do under such circumstances) just when I was about to focus Monte Rosa, and it would have been dashed to atoms had it been of glass. I recovered it uninjured, save that it had fallen upon some snow which melted in the sun and dissolved a patch or two of the film. It has been serviceable, however, for several months since, notwithstanding the damage it sustained.

Zermatt afforded me some very fine negatives this year, and I venture to call your attention to the enlargement of the Matterhorn from a quarter-plate negative up to 25 × 17. This particular picture gave me the secret of success with this description of subject. It has always been a considerable difficulty with me to obtain a satisfactory negative when the background consists of snow peaks. The only reliable plan seemed to be to expose twice—briefly for the mountains, and the ordinary time for middle distance and foreground. I found, however, that in the early morning the light-power is more evenly diffused, and with the usual exposure of thirty seconds at 7.30 on a bright July morning I obtained a very perfect picture from this most difficult character of subject. I am trying an experiment in the case of a double exposure upon the Matterhorn, which I believe will be successful. I propose to print a single transparency from the two negatives by dint of careful masking, and then from the resulting transparency I hope to obtain a negative which shall combine harmoniously the foreground and the background.

Gelatine-film negatives have proved excellent in one respect—they never blur. Now, this immunity from the bane of dry plates has suggested to me the notion that if glass makers would supply us with plates of the peculiar yellowish tinge of the gelatine film we should then abolish the nuisance of blurring, and the equal nuisance of backing, entirely. This could easily be accomplished, I should think, without enhancing the price of the glass, and I am confident that the result would be the abolition of the backing and the consequent freedom of our negatives from most of their spots and streaks.

The photographer's route homeward will necessarily be largely influenced by the condition of his purse and his plate-box. It is usual to leave Paris as a *bonne bouche* for the last, and a most enjoyable route thither will be found by way of Strasbourg to Metz, thence to Rheims, and so to Paris. If the cathedrals of these three cities still leave some unexposed plates, and supposing that Paris is to be avoided, a most interesting route to Boulogne may be taken by way of Laon and Amiens. I once journeyed to Switzerland by this route, and was rewarded with the sight of four of the finest cathedrals in Europe. It may possibly yet be of interest to some to know that the stories of the necessary expensiveness of the Paris of the present have been much exaggerated. We lived sumptuously at a new hotel in the Avenue de l'Opera for ten francs per diem, and that in the full height of exhibition prices.

I must not trespass further upon your patience this evening, but will ask you to look upon the prints I have laid upon the table, and will then proceed to show you a few specimens of the scenery of the Val d'Anniviers in the lantern. H. J. PALMER, M.A.

FOREIGN NOTES AND NEWS.

Dr. Richard on the Elimination of the Chromates from the Carbon Print.—The late International Paper Exhibition at Berlin.—A New Portable Preparation of Collodion Cotton.

In the *Photographische Correspondenz* Dr. Richard has an article on the elimination of the chromates from carbon prints. Quite lately a number of carbon prints fell into Dr. Richard's hands which, though only two years' old, had already become lemon-yellow. This, Dr. Richard thought, was scarcely a proof of the boasted permanency of carbon, so he determined to discover the cause of the yellowing, and the result of experiments convinced him that he had found it in the defective elimination of the chromates, which in the course of time turn yellow.

An important condition in the permanency of carbon pictures is that all the chromates absorbed by sensitising, and not acted upon by the light during the exposure, should be completely removed either by the subsequent shaking or by the development. He thinks that this does not often take place, and that if some of the chromate, or rather bichromate, be not removed, owing to the prints having been left to soak too short a time before being laid upon the transfer paper, it will be enclosed between the upper and under surface, and, being pressed in by the squeegee, it may happen that the developing water does not remove it all, especially if the temperature of the water be not gradually raised.

Dr. Richard is also of opinion that the yellowing of prints is more likely to be prevented by the use of a chromate bath which is free from ammonia than by one containing a large quantity of ammonia, as the latter makes the film more horny and takes greater possession of the gelatine, especially when the tissue is floated for a long time on the sensitising bath, than when a neutral chromate solution is employed.

The *Photographische Mittheilungen* says that though the Germans have, as a rule, held aloof from the Paris exhibition, still they have had a bad attack of exhibition fever, which has broken out in various localities within the bounds of the empire. During the last few months only there has been a Hanoverian exhibition, a Schleswig-Holsteiner exhibition, an exhibition at Erfurt, and now the international paper exhibition at Berlin has just closed. It was expected that many of the exhibits at this exhibition would have been of a nature to interest photographers as such, but not so. For instance, Trapp and Münch and the Dresden photographic paper manufacturers were "conspicuous by their absence." Albumenised paper was only shown by Martin, of Dresden. Nor were photographic mounts much better represented, the only exhibitors being three Berlin firms. Steinbach and Co., however, showed both single and double raw paper as well as photographic roll paper, the width of which was equal to twice the length of an ordinary sheet. The only novelty was frames for photographs made of pressed paper-pulp, exhibited by Stavocky and Haring, of Henschdorf (Silesia). These are coloured matt, and imitate carved wood frames, than which they are much cheaper, though unfortunately the specimens exhibited were far from tasteful. Some paper with artistic watermarks, apparently printed from heliographic plates, was also shown, as were also asphalte pictures, chromolithographs, and photographs proper. There were few samples of bookbinding, and none of the preparation of albumen for photographic purposes.

In consequence of the agitation which has been going on for some time back in Austria and Germany for the freer transmission of collodion cotton, a well-known Berlin firm has patented a new preparation of the raw material of collodion, under the name of "celloïdin." This firm formerly prepared what it called "celloïdin cotton," which was a perfectly pure collodion cotton, quite free from all organic substances, such as dextrine, xyloidine, &c.

Celloïdin is prepared in the form of almost transparent sheets, like gelatine, and is neither inflammable nor explosive; when lighted it burns like paper without exploding, and carbonises slowly when heated in a test-tube. These properties allow of its being safely sent either by post, rail, or sea; but its greatest advantage is that from this celloïdin in sheets, by cutting down the sheet into small pieces and simply dissolving it in any desired quantity of ether and alcohol, a perfectly clear collodion, free from all sediment, is at once obtained and may be used immediately.

Every tablet of celloïdin having a gross weight of about 200 grammes, even allowing for a slight shrinkage owing to the drying-in of the tablet, should contain about forty grammes of pure celloïdin cotton; and to prepare a two-per-cent. collodion take one sheet of celloïdin and add as much ether and alcohol as shall increase the total weight of the collodion to 2,000 grammes, for a three-per-cent. collodion to 1,500 grammes, and for a four-per-cent. collodion to 1,000 grammes.

The celloïdon dissolves with ease, and as soon as solution has taken place the collodion is ready to be iodised. As already mentioned, the gross weight of a tablet may vary slightly owing to evaporation of part of its moisture, but the cotton contents still remain the same.

ON NITRO-GLUCOSE.

[A communication to the Brussels Section of the Belgian Photographic Association.]

For several years my attention has been drawn to a singular body called "nitro-glucose," which accompanies pyroxylines prepared at a high temperature, and which confers upon collodion the property of furnishing images of great intensity, and, at the same time, renders it eminently suitable for dry processes. In addition to this, emulsions of bromide of silver, in order that the best results of which they are susceptible may be derived from them, require, as you know, the employment of high-temperature pyroxyline. In view of the difficulty, frequently considerable, of procuring pyroxyline of this character, its relatively high price, as well as the numerous chances of failure which attend its preparation, from the fact that the strength of the acids—their respective proportions, as well as of the water added—require to be nicely adjusted to the quality of the cotton and the elevated temperature to which it has to be submitted, I have sought to utilise the properties of *nitrated sugar*, and have put the question in this form.

If it be true that it is to the presence of nitro-glucose that high-temperature pyroxylines owe their property of giving a very intense collodion, we ought to be able to attain a like result by the direct addition of a certain quantity of that substance to a collodion prepared from low-temperature pyroxyline. The experiments to which I have devoted myself have amply justified my view of the question, and the object of this communication is to make you acquainted with the results I have obtained. But, first of all, what is nitro-glucose?

As its name implies it belongs to a family of compounds, very numerous at the present day, endowed with more or less explosive properties, and some of which—such as nitro-cellulose or pyroxyline, nitro-glycerine and nitro-benzine—are familiar to you. All these bodies have their origin in a special action of nitric acid, known in chemistry under the name of "nitro-substitution," and which consists in the replacement of one or more atoms of hydrogen by an equal number of molecules of hypo-nitric acid; thus, under the influence of nitric acid, cellulose is converted into fulminating cotton according to the following equation:—

$$\underset{\text{Cellulose.}}{C^6\,H^{10}\,O^5} + \underset{\text{Nitric acid.}}{3\,N\,HO^3} = C^6\,H^7\,(NO^2)^3\,O^5 + 3\,H^3\,O.$$

As it is important to fix the water thus formed—otherwise the nitric acid would set up *oxidation* in place of *substitution*—it is necessary to add a certain proportion of concentrated sulphuric acid. According to the degree of concentration of the acids, and the temperature employed, we are enabled to vary the substitution compound; thus, by employing a weaker nitric acid and a higher temperature we obtain *photographic* pyroxyline, $C^6\,H^8\,(NO^2)^2\,O^5$, in which two atoms of hydrogen are replaced by two molecules of hypo-nitric acid. An entirely similar action is no doubt produced in the preparation of nitro-glucose; and though, as far as I am aware, no formula has been published,* it seems to me that, on the basis of analogy, the composition of this body may be expressed by $C^6\,H^9\,(NO^2)^3\,O^6$, the formula of glucose being $C^6\,H^{12}\,O^8$.

The Preparation of Nitro-Glucose.—The method of preparing nitro-glucose is in every way similar to that of pyroxyline, save that in place of nitric acid of density 1·4 it is necessary to employ the monohydrated acid having a density of 1·5, and known under the name of "fuming nitric acid;" it is also indispensable, as in the case of fulminating cotton, to cool the mixture of fuming nitric acid and of monohydrated sulphuric acid (the density of which is 1·842 or 66° Baumé). For one part of nitric acid we take one to two parts of sulphuric acid, and as soon as the temperature has descended to (say) 10° or 15° C. we add, gradually, by small spoonsful, ordinary refined sugar reduced to a very

* The *Traité de Chimie*, of Schwarts, vol. ii., p. 353, gives the formula $C^{12}\,H^{18}\,(NO^8)^4\,O^{11}$.

fine powder, taking care to stir the mixture thoroughly with a glass rod. As soon as the sugar comes in contact with the acid mixture it assumes the form of viscous clots, which remain suspended in the liquid or become attached to the sides of the vessel. It is difficult to fix the exact proportion of sugar which can be thus converted into nitro-glucose, as the quantity will always depend upon the degree of cooling obtained, &c.; and, though some writers assert that for three or four parts of the acid mixture one part of sugar may be used, I find it better to cease adding the sugar as soon as by the formation of water the temperature rises to 30° C.

In the course of preparation red vapours of hypo-nitric acid are sometimes evolved, but the formation of these may frequently be arrested by stirring the mixture vigorously with the glass rod. Although the transformation of the sugar into nitro-glucose proceeds rapidly, it is convenient to prolong the action of the acids for four or five minutes. The acid mixture is then poured into a large porcelain basin containing ordinary water, in which the nitro-glucose, being insoluble, forms itself into small, pasty lumps, settling rapidly to the bottom of the basin or adhering strongly to its sides, permitting the acid to be decanted and replaced by water, which may be again replaced by a fresh quantity of the acid mixture if needful; so that by successive precipitations and decantations the whole quantity of nitro-glucose may be collected at the bottom of the basin. With a rod or small plate of glass the viscid mass is detached from the vessel, having a greyish white appearance, sometimes slightly reddish from the presence of hypo-nitric acid, and kneaded into a solid mass, which is immediately submitted to washing. This operation, long and tedious from the pasty nature of the substance, can only be effected by treatment similar to that to which butter is submitted, only that in place of using the hands we have recourse to a pestle and mortar, with which the mass is kneaded, changing the water frequently until it exhibits not the slightest acid reaction to blue litmus-paper. It is finally washed in distilled water until a small quantity of this water filtered gives no cloudiness with solution of nitrate of silver.

The nitro-glucose may be preserved under distilled water in a wide-mouthed, stoppered bottle. Notwithstanding the most careful washing, nitro-glucose thus kept under water disengages within a short time of its preparation, slowly but continuously, nitric acid.

Physical Properties.—Nitro-glucose presents the form of a pasty, sticky substance, white, sometimes slightly grey, plastic and adhering to the fingers, and capable of being drawn out into long, white threads of a silky lustre. Dried in the cold it becomes hard and brittle; left in water it again becomes soft and sticky. Without taste or smell, it behaves in the presence of solvents after the manner of a resin; it softens under the action of heat, and explodes at a higher temperature. In the same manner as glucose it acts upon polarised light, turning to the right the plane of polarisation.

Chemical Properties.—Nitro-glucose is insoluble in water, soluble in ether as well as in alcohol, though it does not dissolve rapidly except in boiling alcohol. The hot saturated solution allowed to cool deposits a certain quantity of nitro-glucose, which a fresh quantity of alcohol again dissolves. I have found in this way that one part of moist nitro-glucose requires seven to eight parts of alcohol of 96° for its complete solution at ordinary temperatures. The alcoholic solution poured into water gives a white precipitate of nitro-glucose in a state of very fine division, which does not settle to the bottom of the vessel for several days. A solution of caustic potash poured into alcoholic solution of nitro-glucose produces rapid decomposition even at ordinary temperatures; the liquid discolours, and the products of the decomposition are, without doubt, identical with those obtained in the case of glucose. It is also decomposed by solution of cuprous chloride, and it is probable the same occurs with stannous chloride and ferrous sulphate, which, as we know, decompose pyroxyline.

Alcoholic solution of silver nitrate poured into a similar solution of nitro-glucose produces a cloudiness, or even a precipitate, more or less considerable. The precipitate which remains white in the dark discolours rapidly in daylight, and deposits a blackish powder, which consists of reduced silver. This powder, collected on a filter and carefully washed, is dissolved by nitric acid with evolution of ruddy vapours; and hydrochloric acid produces with it a precipitate soluble in ammonia. Glucose exercises on silver nitrate a still greater reducing action, as it manifests itself even in the dark. When a little ammonia is added to the mixed solutions of silver nitrate and nitro-glucose, or of silver nitrate and glucose, the reducing action is considerably increased. According to Hardwich, the intensity of collodions prepared from high-temperature pyroxyline is due to the combination which takes place between the silver nitrate and the nitro-glucose. Such is not the opinion of Dr. van Monckhoven, who holds that it is not with this latter body that the combination takes place, but with a compound arising from its decomposition. According to that gentleman an alcoholic solution of recently-prepared nitro-glucose is not clouded by the addition of silver nitrate; but if this solution be several days' old the nitrate of silver produces an abundant white precipitate very sensitive to light. My experience, on the other hand, agrees with Hardwich's view; for I have always found that newly-prepared nitro-glucose, as well as that kept several weeks in the state of alcoholic solution, is clouded by silver nitrate when the solution of nitro-glucose is sufficiently concentrated; otherwise it only produces an opalescence more or less pronounced. A further proof that the combination of the silver salt takes place with the nitro-glucose itself, and not with a body resulting from its decomposition, is found in the fact that an alcoholic solution recently prepared and added at once to collodion gives, in the state of emulsion, the same density as is obtained with a solution which has been kept several weeks.

M. DE PITTEURS.

(To be continued.)

Our Editorial Table.

ANTHONY'S SOLUBLE COTTON.

Liverpool: J. J. ATKINSON.

MANNERS and customs in trades and professions, as well as in social life, vary according to the different countries in which these are practised. For example: in our own country few photographers ever make the collodion they use, preferring to purchase it ready prepared. They rightly believe that those who devote much of their time to the production of any specific article are much more likely to succeed in its proper manufacture than he who does so in perhaps a *dilettanti* manner at occasional intervals. In America, on the contrary, it appears to be the custom of photographers to prepare their own collodion, in the same way as they prepare the baths, developers, and other compounds employed.

Readers of the American journals, or of such extracts as we present of them from time to time, will have noticed that when a photographer indicates his method of working he almost invariably sets out by giving the formula by which his collodion has been prepared—a fact corroborating our remark as to the universality of the practise of the home manufacture of this indispensable production. But, while preparing their own *collodion*, American photographers very wisely draw the line at the preparation of the pyroxyline, or "soluble cotton," as our transatlantic brethren prefer to term it.

The soluble cotton manufactured by Messrs. E. and H. T. Anthony and Co., of Broadway, New York, has for a long period enjoyed a very high reputation, the process by which it is manufactured having been patented five years since in America. Had a patent been obtained for England we should have been enabled to communicate to our readers all about its method of preparation; but, under present circumstances, it is only left for us to review the sample that has been placed at our service by Mr. John J. Atkinson, of Liverpool. Upon placing a portion of it in a mixture of ether and alcohol it dissolved in the most perfect manner, without leaving even a trace of residue. When it was afterwards iodised it yielded a collodion of admirable quality, and which possessed every advantage that could be desired. The formula by which it was iodised is that which is given on page 210 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for the present year.

We embrace this opportunity of acknowledging the receipt of some samples of collodion, ready iodised, which were handed to us by Mr. E. B. Barker, of the firm of Messrs. Anthony and Co., when that gentleman last visited London. This collodion gave most charming results, a peculiarity in its working being that with a weak iron developer full printing density was at once obtained, without the necessity for the employment of any intensifier afterwards. We presume it was made from pyroxyline similar to that to which we have above referred. Perfect transparence, freedom from crapiness, sensitiveness, and excellent half-tone are its characteristics. The "soluble cotton" is well adapted for emulsion processes, although it does not appear to have been prepared with this end in view.

THE UNIVERSITY MAGAZINE.

London: HURST AND BLACKETT.

FOR the reason given when noticing a previous number of this *Magazine*, we much prefer the portraits which form the illustrations when they are printed from negatives taken by Messrs. Lock and Whitfield. The lighting, gradation, and intensity of their negatives are such as to render them specially adapted for printing by the Woodbury process.

The noble portrait of Professor Max Müller, with which the October number is illustrated, is one of the finest that has yet graced the pages of the *University Magazine*. The eminent occupant of the chair of Comparative Philology at Oxford is represented in profile. From the biographical sketch accompanying the portrait we learn that Professor Max Müller was born at Dessau on the 6th December, 1823, and was educated at Leipzig. He came to England in 1846 to collate the manuscripts belonging to the East India Company and those of the Bodleian Library, with a view to the publication of the "Rig Veda," the earliest sacred hymns of the Brahmins. Literary honours were soon showered thick upon him, and he is now recognised as one of the most profound Sanskrit scholars in the world. The portrait, by Messrs. Lock and Whitfield, is an excellent one, and is admirably printed by the Woodbury process. The other articles in the magazine are of the usual high type.

GIHON'S PHOTOGRAPHIC COLOURISTS' GUIDE.
Philadelphia: EDWARD L. WILSON.

IN this manual Mr. John L. Gihon, with whose name our readers are familiar, haa embodied his own experience, together with the suggestions and useful items received from many artistic friends. In addition to remarks on India-ink work the author treats of water colours, oil paints, pastels, negative retouching, and rudimentary perspective. The work is written in a pleasing style and contains much useful information. For these reasons it is certain to find much favour among photographers. Its publication is confined to America.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 7	West Riding of Yorkshire......	Oddfellows' Hall, Bradford.
,, 9	Glasgow	172, Buchanan-street.
,, 9	Cheltenham Amateur..........	Savings' Bank.
,, 10	Manchester (Annual Meeting) ..	Memorial Hall, Albert-square.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual monthly meeting of this Association was held on Thursday, the 26th ult., at the Free Library, William Brown Street,—Mr. H. A. Wharmby, President, occupying the chair. Being the first meeting after the summer recess there was a very good attendance.

The minutes of the last indoor and the two outdoor meetings having been read and passed, Messrs. R. H. Forman and F. W. Birchall were elected members.

A resolution, proposed by the Chairman and seconded by Mr. J. A. Forrest, was passed, conveying a vote of thanks to Miss Watt, of Speke Hall, by whose kind permission the Association held an outdoor meeting on 25th July, in the grounds.

The following resolution, proposed by Mr. T. Clarke, seconded by Mr. E. Whalley, and supported by Mr. J. A. Forrest, was also passed:—"That this Society tenders to the Right Hounourable W. E. Gladstone its best thanks for his kindness in permittiug the members of the Manchester Photographic Society and the Liverpool Amateur Photographic Association to photograph in Hawarden Park on Saturday last, and also to express its appreciation of the friendly manner in which he personally tendered information as to the most desirable views and points of interest in the park."

The Secretary *(pro tem.)* was instructed to transmit both the above resolutions to the proper quarters.

The pictures produced at Speke Hall were then passed round. The prize—a beautiful album, given by Mr. J. A. Forrest—was adjudicated by Mr. Sayce to Mr. Potter, for the best picture taken on the day of the excursion, for an exceedingly beautiful view of Speke Hall.

Mr. Houlgrave exhibited several fine pictures taken from negatives on collodion and gelatine plates for purposes of comparison. The results were certainly much in favour of collodion.

Mr. J. H. T. Ellerbeck explained that he had by mistake exposed a "Bennett" plate for half-an-hour aud a "Pollitt" plate for half-a-minute, the curious result being that the usual development produced a decided transparency on the "Bennett" plate instead of an over-exposed negative, while even on the "Pollitt" plate an image was produced, although the plate was utterly spoiled for printing purposes owing to the large amount of carbonate of soda used.

Messrs. Weber, Potter, Kirkby, Boothroyd, and Clarke brought a large quantity of very fine results from gelatine and collodion emulsion and other plates, all of which proved a great advance on those of former summers.

The Rev. H. J. Palmer spoke of developiug gelatine plates with the ferrous oxalate, the results being very satisfactory, no toning being required for transparencies. Much pleasure was expressed in examining a very good enlargement 24 × 18 from one of his recent gelatine negatives—a view of the Matterhorn. He (Mr. Palmer) then read a paper on *Switzerland from a Photographic Point of View* [see page 473], illustrated with views taken during his summer trip to Switzerland, and which, from their number and quality, prove him to be a most careful and indefatigable worker.

Owing to the lateness of the hour and the large amount of interest already before the meeting the lantern exhibition was postponed for a future evening, and, after a vote of thanks to Mr. Palmer and other contributors, the meeting was then adjourned to the 31st inst.

THE BRUSSELS SECTION OF THE BELGIAN PHOTOGRAPHIC ASSOCIATION.

AT the June meeting of the above Section a communication was made by M. de Pitteurs, of St. Trond, on the subject of nitro-glucose, the disscussion of which formed the only business of the meeting. After the reading of the communication, the first portion of which will be found on page 475,

Dr. VAN MONCKHOVEN remarked that the practical importance of the addition of nitro-glucose to the collodion for emulsion purposes could not remain in doubt after an examination of the negatives exhibited by M. de Pitteurs. Some years ago he had prepared large quantities of nitro-glucose, and he had found great want of unformity in the products obtained. He had been in the habit of purifying the nitro-glucose by dissolving it in alcohol and reprecipitating it in water, and he thought it would be well if M. de Pitteurs would describe very particularly his method of preparation in order that others might be enabled to attain identical results. He said he had frequently observed that the addition of silver nitrate to a fresh solution of nitro-glucose produced no immediate precipitation, whilst old solutions invariably gave a precipitate, as is also the case with old non-iodised collodions, which are said to give great intensity; he considered it very possible, however, that his solutions were not sufficiently concentrated. He further expressed his opinion that none of the nitro-substitution compounds combined directly with nitrate of silver. According to his view considerable importance was erroneously attached to the temperature in the preparation of pyroxyline. He believed that the differences observed arose from the presence of resinous matter in the cotton, and he had found that cotton previously washed in soda gave the same results when prepared at a high or low temperature. For dry plates, by employing very resinous cotton great density was obtained. He inquired whether M. de Pitteurs could state what was the colour of his bromide films by transmitted light.

M. DE PITTEURS replied that he had not paid any special attention to that point, but he believed that the colour was orange.

Dr. MONCKHOVEN said it would be extremely interesting to try whether such films were sensitive to the red or orange rays of the spectrum.

M. ROMMELAERE announced his intention of undertaking a series of photo-spectroscopic researches, and of repeating some of the important experiments of Captain Abney iu that direction.

Dr. MONCKHOVEN said that, looking at the recent experiments of Captain Abney, Vogel, and others, we were not far from attaining a process which would enable us to prepare plates sensitive to the green rays. This would be of the greatest utility, not only in landscape work but also to the professional photographer in the studio, and for the reproduction of paintings, &c.; for, if the plates be sensitive to the green, it is probable they will be so also to the red and yellow rays, aud thus we should be no louger subject to the defect inherent to existing processes, by which deep colours—as blue and indigo—are rendered lighter, whilst light colours—yellow and red—are reproduced darker, than in nature.

A vote of thanks was passed to M. de Pitteurs for his communication, which it was resolved to publish in the *Bulletin* of the Association.

PHOTOGRAPHIC SOCIETY OF VIENNA.

AT the May meeting of this Society the chair was taken by Herr Melingo, in the absence of Dr. Hornig.

Business was commenced by the admission of three new members. A letter was then read thanking the Society for the laurel wreath which had been placed, in its uame, upon the grave of the late Herr von Voigtländer. Captain Tóth was elected a member of the managing committee of the Society in the room of Dr. Eder, resigned.

The Secretary laid on the table some samples of Berthold's paper substitute for liuen plate polishers, and a copy of *I Moderni Processi di Stampa Fotografica del Luigi Borlinette*, richly illustrated by specimens of carbon printing, lichtdruck, zincography, and heliography, after which he read au article from the *Wiener Medicinischen Blätter* upon the quivering of the eyes of the sitter when being photographed.

Dr. Székely showed a drying oven of the construction recommended by Professor Husuik, as well as some specimens of the results obtained by the dusting-on method of multiplying the negative described in the work of the latter.

To the question as to whether any gentleman present had obtained good results with the dusting-on process,

Herr HAACK said he used to dabble with that process, but his results were never all that could be wished. The principal drawback he had to contend with was that the copy negative always appeared over-exposed in the lights or shadows—in short, that he could not secure the proper proportionate distribution of light and shade given by the original negative.

The Secretary then read an extract from the *Neuen Freien Presse*, of the 6th March, which had been placed in the question-box, accompanied by an inquiry as to the correctness of its statements, the name of the learned Frenchman, wherein his process consisted, and how far The British Journal of Photography was justified in its remarks. The article was headed *Telegraphic Photography*. It has been said that a French *savant* had found a practical way of transmitting photographs to a distance by means of the telegraph, and that the French police propose to utilise it for the detection and arrest of criminals. The British Journal of Photography gives an exact description of the method, which is based on the same principle as the Bonelli-Hipp writing telegraph. "As in the latter the writing remains white on specially-prepared paper, while the portions of the paper unwritten upon are coloured blue by strokes of the telegraphic pencil placed close beside each other, so in like manner the photograph is reproduced, though somewhat coarsely."

After receiving the above questions Herr Quidde had communicated with Herr Wimpfen, the inspector-general of Austrian telegraphs, who informed him that as yet it had not been found possible to reproduce a photograph exactly by telegraph, though it might be done with approximate precision when, as in Baird's apparatus, the portrait is first transferred to a sheet of metal and then drawn in strokes of various thickness, which allow of isolation. Still, even with an apparatus like the medallion Guillochir machine, in which the Woodburytype metal plate of a portrait is placed, and the movements of a lever passing over the surface of the plate are transmitted by telegraph, an exact reproduced portrait with all the half-tones is not to be expected.

Baron Schwarz said that ten years ago he had seen an apparatus working between Paris and Lyons which telegraphed handwriting and outline portraits, but from its cost, as well as from technical objections, it could not be generally employed.

Herr Silas remarked that on account of its enormous cost Caselli's pendulum telegraph had not been employed for this purpose, though well adapted to it.

A specimen of mastic was exhibited and the reason of its non-solubility in benzine was asked, to which Herr Haack replied that the person who put the question had evidently bought an adulterated powdery sample of mastic, and advised him in future to buy it only in small lumps, when it ought to dissolve readily in benzine. The meeting was shortly afterwards adjourned.

Correspondence.

REMOVING PYROGALLIC STAINS FROM THE HANDS.

To the Editors.

Gentlemen,—I notice in your "Answers to Correspondents" (in reply to a query from a "Country Parson"), that you recommend friction with a piece of pumice stone, using soap as a lubricant, for removing stains from the hands. It is very good; but I think you will find the method I send you quite as good and much more pleasant to use. It is as follows:—

I have a bottle filled with silver sand placed on the washstand, or where the hands are generally washed. Get a good lather of soap on the hands first; put the piece of soap out of the way, and then shake from the bottle some sand into the palm of the hand, and proceed to rub over the hands, especially where stained. It is surprising how quick the stains are removed, and how pleasant and soft the hands feel after the above treatment. Of course wash off with clean water.

Keep the sand away from the piece of soap, or it will make the soap very disagreeable to use.—I am, yours, &c., Richd. Crowe.

25, *Williamson-street, Liverpool, September* 30, 1878.

ANSWERS TO CORRESPONDENTS.

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

☞ With reference to the series of articles on *Photomechanical Printing Methods* by Mr. Thomas Bolas, F.C.S., the first of which appears this week, the author will be happy to reply, in our "Answers to Correspondents" column, to such queries respecting the subject as may be forwarded to him through us.

Erratum.—We regret that an error occurred in the "making up" of the formes of our last number, whereby the two lines which should have followed those terminating the first column, page 458, have been transferred—not to the column immediately succeeding this, but to the first one on page 459. Will our readers kindly make a note of this?

R. Peers.—You must state what is required.

Dr. Liesegang.—Accept our thanks for your courtesy.

S. J.—For terms apply to the Autotype Company, Rathbone-place.

G. A. L. P.—One fertile source of yellow spots in prints on albumenised paper is the presence of minute metallic particles, mostly to be found in the back of the paper.

R. R. Brown.—There is a manual of the ferrotype process. We are not aware who is the publisher, but you will doubtless obtain it on application from some of the dealers in photographic materials.

Felix (Leeds).—Professor Husnik's method of preparing photolithographic transfer paper was published last year. It will be found in our Almanac for the present year, to which we refer you.

R. H. L.—The formula for the varnish will be quite as effective if the oil of lavender be omitted, but the odour will be unpleasant. Oil of spike and essence of lavender are not the same substance.

Old Hypo.—1. Let the mixture be composed of equal parts by weight of the uranium and ferridcyanide.—2. Persulphate of uranium costs from one shilling and ninepence to three shillings, according to circumstances.

C. T. P.—Instead of using carbonate of ammonia in the developer, try the effect of ordinary washing soda in the proportion of one drachm to each ounce of water—of course making use of bromide of potassium as a restraining agent.

Capt. B.—By addressing a note to Mr. A. J. Melhuish, who is the honorary secretary, you will receive all necessary information with respect to the Amateur Photographic Association, including the terms upon which members are admitted.

T. H. H. B.—Certainly; but, while oxygen may be produced by the process you describe, it is a very tedious and expensive one, and you will study your own comfort and interests by confining yourself to the method by chlorate of potash.

Geo. Hercus.—We tried the sample of pyroxyline you forwarded, but found that it was very bad, being quite unsuitable for collodion. We have no means of ascertaining to what the failure was owing. Try again, making use either of the same or of another formula.

Polaris.—The nitre-sulphur light enjoyed popularity for only a brief period. It seems now to have "gone out;" at anyrate we never hear it so much as spoken of. Such particulars as are known concerning it will be found in the numbers of this Journal published early in 1875.

Anglo-American.—Although a patent was applied for, the protection granted did not extend beyond six months; hence you are quite at liberty to practice the process, provided you imagine that it contains a germ of value. Our own opinion was published more than twelve months ago.

J. D. L.—Our thoughts and intentions have been running in parellel grooves. We shall communicate privately with you soon with a view to determining upon the best manner by which to enable the public to be participants in the advantages that would undoubtedly follow the selection proposed to be made.

A. S. F.—From your description of the iodide of ammonium it is quite evident that it has become decomposed. Try the effect of placing the whole of the contents of the bottle in an evaporating dish, adding two or more drops of sulphide of ammonium, and slowly applying such a degree of heat as to drive away the water.

Obliged Reader.—1. If you colour the slides with aniline preparations it will be a source of regret, as they will fade sooner or later.—2. The manual named appears to be a good one, but we can only judge of this from an edition published about twelve years ago. Possibly another edition has since that time been issued.

A. A. Campbell Swinton.—The address as given by you—that is, the name and the city—will prove sufficient to ensure a letter reaching the gentleman. Mr. Solomon, of Red Lion-square, is the only dealer in London by whom the article required used to be kept; it is possible that he may still have some of it or be able to procure it.

A. J. Jarman.—We are quite unable to inform you how to make chloroplatinate of potassium "readily," for this is not yet known, but by consulting *Fownes* you will discover the means by which it may be made, although these are not very simple. Ferric oxalate may be procured from Messrs. Hopkin and Williams. We shall be in a position to give further details concerning the platinotype.

E. T. Whitelow.—1. In reply to your query respecting the solubility of protosulphate of iron, the following will prove an excellent and instructive bit of chemical amusement:—Pour into an evaporating dish an ounce, by measure, of the solution of protosulphate of iron, and apply heat until the water has evaporated. By weighing the remaining crystals and allowing for their bulk in the solution you will have your query answered. We, like you, have found much diversity in the publications on this subject.—2. By inserting a slip of litmus-paper in the alcohol you will easily ascertain whether the acid was or was not added. It might even be ascertained in a more "rough-and-ready" manner by adding to a small portion of the solution a minute lump of chalk, which would cause an effernescense.

Sad End of a Photographer.—On Saturday last, the 28th ult., an inquest was held at the "Cape of Good Hope," Limehouse, touching the death of David Henry Poole, aged forty-four, of Robin Hood-lane, who had died under the following sad circumstances:—Deceased, a photographer, had long given way to habits of intoxication, and while in that condition was perfectly ungovernable. On Wednesday he had started drinking early in the morning, and at midday a brother photographer fetched him out of a public-house and took him home. After a great deal of trouble he induced him to lie down, and left him covered with a blanket in a sound sleep. His son coming in soon afterwards found him lying on the floor with a cut on his temple, evidently caused by falling out of the chair in which he had been placed. A doctor being sent for he was found to be quite dead. Dr. Brunton, who had made a *post-mortem* examination, attributed the death to hemorrhage into the brain—the combined result of his drinking and quarrelsome habits and the fall. A verdict to that effect was returned by the jury.

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THE BRITISH
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No. 962. Vol. XXV.—OCTOBER 11, 1878.

THE PHOTOGRAPHIC EXHIBITION.

Apart from the fact that the *conversazione* with which the Exhibition was inaugurated on Tuesday evening last was somewhat unpleasantly crowded, there was no doubt whatever as to the *soirée* having proved a genuine success. Everybody, too, seemed to consider that the pictorial display was also successful, with the exception, perhaps, of the time-honoured dissentients who, abstaining from being exhibitors themselves, therefore "knew all along it would prove a failure." Absentees notwithstanding, the Exhibition is a good one, and is fairly representative of the best class of what we shall designate "everyday photography" in contradistinction to special efforts made by those whose time, not less than their artistic ability, permits them to prepare works expressly for exhibition.

The walls of the room are well covered, and the hanging very artistically effected. While we this year miss the productions of such exhibitors as Colonel Stuart Wortley, Messrs. Robinson, Blanchard, Viles, Crawshay, York, Whiting, Fry, Beasley, Mawdsley, S. G. Payne, Mrs. Payne, and others who have contributed to previous exhibitions, we notice the names of several artists who have hitherto withheld their work from these annual displays. We are glad to find that the various dry processes at present in use—mainly emulsion processes—are well represented.

Contrary to the customary usage the medals have already been awarded.

In *genre* pictures we are much pleased to renew our acquaintance with the large dog of Mr. Geo. Nesbitt, who has obtained a medal for his picture entitled *Broken Leg* (No. 212), representing a girl and *the* dog. Of the other exhibits of this artist we shall speak by-and-by.

The two medals offered for "the picture or series of pictures which, in the opinion of the judges, shall display the greatest amount of excellence" have been withheld, none in *their* opinion being apparently worthy of such awards.

The medal offered for "the best landscape or series of landscapes" has been divided, so to speak, one medal having been awarded to The Military School of Engineering, Chatham, for a *View near Bettwys-y-Coed* (165), and another medal being given to Mr. Vernon Heath for a frame of four views, *The Hills of Skye* (11).

For "the best portrait or series of portraits" the promised medal has been withheld, none seemingly being thought deserving of such distinction. The same verdict applies in the case of the medal offered for "the best transparency," and also for "the best microphotograph or series of microphotographs." Let it be distinctly understood that we are not here recording *our own* opinion of the merits of the pictures, but only that of the judges.

One of the two medals promised for "the best photo-mechanical prints" has been withheld; the other has been awarded to the frame of prints entitled *Book Illustrations* (321), exhibited by the Woodbury Company.

For "the best single figure study" the medal has been awarded for one of the figures in *The Seven Ages of Man* (293), by Mr. Augustus W. Wilson.

The inventive skill of Mr. Cadett, whose ingenious pneumatic shutter we described a short time since, has been appreciated by the judges, who have awarded to this gentleman the medal "for apparatus."

It will be remembered that medals were placed at the disposal of the judges "for any novelty, or other form of excellence, in process or result." Acting under the discretionary powers thus conferred, the judges have awarded a medal to Mr. Payne Jennings, for a frame containing eight instantaneous effects, *Sea Studies* (199).

As in previous years, we will next week commence a systematic series of articles dealing critically with the pictures exhibited; meanwhile, we shall devote a brief space to the apparatus and the contents of the large table in the centre of the room.

This table is, indeed, very richly laden. In attempting to describe the various exhibits here displayed we shall commence with those we consider the most important. Agreeably with this intention we shall describe the imposing collection of apparatus sent by Mr. George Hare, of Calthorpe-street.

To the non-photographic visitors the two revolving albums of Mr. Hare proved the main source of attraction on the opening meeting; for, as the well-balanced body was rotated on its axis, displaying fresh pictures at each revolution, wonder and delight were apparent in the face of each spectator. The *connoisseur*, moreover, saw in these albums the most perfect finish capable of being put upon wood; while the professional photographer as certainly recognised in them an important addition to the attractions of the waiting-room connected with his establishment. For us, however, the newly-designed cameras of this maker possessed a greater degree of interest than even the most approved appliances for the mere exhibition of pictures; and we were pleased to have an opportunity of examining *facsimiles* of two of the cameras for which a medal has just been awarded to Mr. Hare at the Paris International Exhibition. So far as we could perceive, from a careful examination of one of these cameras adapted for 10 × 8 pictures, its leading features are comprised in the following:—Owing to a particular formation of the base-board it has a double range of extension and adjustment, one of these motions being, to employ microscopic language, "coarse," and the other "fine." The "coarse" adjustment is, however, one of extreme smoothness in itself, being effected by sliding back the body of the camera in appropriate slots in a light brass frame-work upon the main sliding base-board of the instrument. In this state it forms a camera of great utility, capable of producing nearly every description of picture required in ordinary practice where a lens having a moderate width of angle is employed. But by the operation of a rack and pinion the supplemental base-board, to which is affixed the the back of the camera, is made to slide out a considerable extent farther—so much so that it can be used as a copying camera. The back of the camera is so constructed that the photographer may at the last moment, and after focussing and arranging his subject, vary the direction of the plate from a horizontal to a vertical position. When packed up this camera occupies a marvellously small space. We have been thus particular in describing it inasmuch as it is the only English camera that received the distinction of a medal at the Paris exhibition.

Of the automatic changing-box exhibited by Mr. Hare we need not now speak, as it has already been described in our pages, and has taken its position as an almost indispensable piece of apparatus in connection with dry-plate work.

Only a brief period having elapsed since we had an article on the electric method of exposing, associated with the names of Messrs. Cowan and Cussons, we need here only say that one of the most recently-constructed electric shutters is to be seen on the table. It is in full action—a fact that may be immediately ascertained upon pressing the ivory button in the end of the pear-shaped wooden handle which forms the terminus of the cord.

Messrs. W. W. Rouch and Co. also exhibit two of their recently-patented cameras, of which we gave a detailed account in our issue for August 30th. [See page 408, *ante.*]

Here we must take leave of the apparatus for the present, promising to return to the subject next week. As in former years, we give such notices of the Exhibition as have appeared in the London daily press up to the present time. These will be found in another portion of the current number.

ON THE QUALITIES DESIRABLE IN A NEGATIVE.

We commence this article by asking the question, "What constitutes a good negative?" Probably if we took the suffrages of our readers we should obtain a wonderful variety of replies, each individual expressing an opinion based upon the standard of his own productions. In point of fact there exists no general standard of quality. We are in the habit of seeing prints of a more than ordinary degree of excellence, perhaps; and we find ourselves in a position to appreciate the beauty of the *tout ensemble*—possibly to pick out one or two points in which they excel the ordinary run of photographic work, but that is all. It never occurs to us to ask ourselves the question, "What sort of a negative was that produced from?" or to attempt to get at the real cause of its superiority. We are content to accept the final result as it is presented to us, and to look upon the negative as merely one step towards that result.

Thus it is that too many go groping, as it were, in the dark, turning out negatives of more or less excellence, and content if they come up to the standard of quality, *as negatives*, which they themselves have created, and never, perhaps, dreaming of judging them by the test of their printing qualities. How often do we hear remarks such as "This negative ought to give a much better print!" or "I never expected that negative to print so well!" In the first case, when, after repeated trials, the negative will *not* "give a better print" the blame falls upon the printing arrangements, and, possibly, some unfortunate albumeniser feels his "ears tingle" without knowing the reason why. The second result is set down as one of those lucky "flukes" which "*will* happen," but there is no attempt to discover the *raison d'être* of the unexpected excellence.

The fact is, the practice is too prevalent of judging the negative solely by its appearance, and "pretty" negatives have become the fashion, or are sought after, with an entire disregard of the ultimate purpose they are required to fulfil. It would, we think, be time profitably employed if our readers would devote some of their spare evening hours to a careful study of their negatives, comparing them with the prints therefrom, and noting the special character of negative which produced any uncommon effect in the print. It is not necessary for such an examination that the negative be a perfect one, or even a passable one as *a whole;* for it frequently happens that a picture spoilt by over- or under-exposure contains a tree or a mass of foliage, a foreground or a distance, which is rendered perfectly, though the rest of the plate is useless. Better still would it be if the examination could be extended to the work of others; for as every photographer possesses, to a certain extent, a style of his own, an opportunity would thus be afforded of studying a new class of effects, not, perhaps, found in the photographer's own works. In this manner the eye would be trained to a better perception of the printing value of the negative, and the operator would be taught the class of image to aim for in developing. Development, without doubt, is the most important step in the production of the picture, and, unless commenced with a clear understanding of what is expected from it, the quality of the sensitive film, the proper illumination of the subject, and the correct timing of the exposure, avail little or nothing.

We come back to the question, "What constitutes a good negative?" We recollect once hearing the question epigrammatically answered thus—"Density in the lights, detail in the shadows, half-tone throughout"—three most desirable qualities, nay, indispensable, for no negative will pass muster without them; but the description is incomplete. We have a negative before us as we write, the subject a rural one, consisting of a farmstead and outbuildings, with a grassy foreground and dense foliage for the background. In nine cases out of ten the verdict would be that the negative is all that could be desired, and we invite our readers to take an imaginary glance at it as we point out its salient features. The principal object, the farmhouse is a low, white, rough-cast building, with thatched roof—a difficult subject and highly unpicturesque, unless treated as Millais treats white satin—the outbuildings brick and dark stone, with here and there a patch of vegetation, the tiled roof almost hidden by vari-coloured lichens, and the surrounding foliage in the full luxuriance of summer.

Take a good look at the negative; you will see that though the white building is dense almost to opacity there is plenty of detail visible. Here on the front a patch of the "rough-cast" has fallen away and laid bare the bricks, which have been re-covered with whitewash. See! under the windows the rain has drained away from the sills, leaving dark streaks, and there on the gable end the drainings from the thatch have left traces which even the broad glare of sunshine has been unable to hide from the camera. Trace the courses of the stone in the masonry of the granary, and note the variations in the shades of colour of the different blocks; count the trees in that mass of foliage at the back; you can almost do it, so faithfully are they rendered and so complete in detail. Density, half-tone, detail everywhere, and, yes! under that wood-shed, where the sunshine is cut off sharply by the projecting roof, there is a patch of clear glass. Certainly the negative seems perfect in every respect; but let us examine the prints.

We have two here, but surely they do not come from the negative we have just examined. This darker one certainly renders the central object to perfection—thatch, whitewash, weather stains, and all; the granary, too, comes out well, and the roof of the cowhouse, with its covering of lichens, is admirable; but where is all the detail in the foliage? This other print renders the foliage well, but the outbuildings are feeble and poor in tone; the house *is* whitewash and nothing else, and whoever gave it its last coat appears to have projected his bucket over the roof of the cowshed as the readiest means of getting rid of it when done with. Ah! friend, we left one little item out of the formula given above: besides density, detail, and half-tone we want *harmony*, and *there* is just where the majority of negatives (dry-plate ones, at least) fail. The negative we have described is, no doubt, nearly perfect in its separate parts, but the parts do not fit into a perfect whole. It requires two or three separate printings to produce a harmonious print.

Here is another negative, which takes us away to the breezy mountains. We stand on the spur of a hill a couple of hundred feet above a valley which stretches away before us until it loses itself in the hills in the distance. There, at our feet it seems, runs a little river, which here and there flashes back gleams of sunshine; on the opposite side of the valley, half-a-mile or more away, rises abruptly a rocky slope partly covered with straggling bushes; to the right another hill juts out into the valley thickly clothed with dark pine and larch; and looking down the river we have range after range of hills losing themselves in the distance. Notice how you can pick out every shrub on the slope opposite, and trace the contour of each individual tree in the pine wood to the right! There is detail everywhere; even in the distance, three or four miles away, we can distinguish a shepherd's hut or structure of some sort. We turn to the print; all the detail is there certainly, but what a tame and spiritless transcript of the scene! The distant hills, the sombre pines, the heather in the foreground, are all rendered in almost the same tint; even the flashes of sunlight from the river come up with a subdued look as if they felt themselves out of place.

We have secured harmony here decidedly, but we have carried it too far. What we now want is *contrast;* and these two qualities are the Scylla and Charybdis, between which we have to steer in the production of an artistic result. Density, half-tone, and detail are absolutely necessary attributes in a *photograph;* but to obtain a *picture* we have to study those extra qualities. In other words, the one set are technical, the other artistic, qualities; and as a good negative must be both technically and artistically perfect we have arrived one step nearer a true definition.

But how are these special properties to be secured? We know that starting with a sensitive film in perfect condition, no matter by what process prepared, we are able to produce a result which, as far as mere manipulatory excellence goes, may be nearly perfect, by merely attending to the correct adjustment of the exposure and development, though, judged from an artistic point of view, it may be deficient in many qualities. The difference can only be made up by the most careful attention to other conditions, which not unfrequently are more or less beyond the control of the operator, or, at least, necessitate such an amount of patience and skill in their application that it is practically beyond the power of many, especially amateurs, to give much heed to them, and thus it is that though we see so many technically good negatives we meet with so few artistic prints. In another article we shall consider the various circumstances which operate for or against the production of artistic results, our space in the present number being exhausted.

PHOTOGRAPHING "STILL LIFE"—MACHINERY.

We do not exactly know why inanimate objects should have the term "life" applied to them, but there is scarcely a more expressive term in the slang of art than "still life" applied to all objects which are the reverse of living. There are many articles coming into this category to illustrate which photography is invaluable, and a considerable number of them require some amount of experience and the wrinkles acquired thereby in order to obtain satisfactory results. Not the least important among them is the production of photographs for the engineer and millwright—locomotives, tenders, waggons, stationary engines, castings, and similar objects—some hints upon photographs of which, we think, may be useful to a number of our readers.

An ordinary landscape outfit will be sufficient if it comprise a variety of lenses giving straight lines. It will not be sufficient to have merely a large assortment of lenses; they must form a regular series as regards their focus. We find far too many operators select their lenses for their variety of purpose instead of taking note more particularly of the focus. Thus we have many times met with photographers having a large collection of valuable instruments, but which did not enable them to master all varieties of enforced standpoints. In one instance five or six lenses for 12×10 pictures ranged in focus about ten inches and fifteen inches, the varieties being made up of wide angle, medium angle, so-called group and quick-acting lenses of various makers, which the owner had been recommended from time to time by various friends to purchase. Now, if he had chosen (say) a seven, eight, ten, twelve, fourteen, and sixteen-inch focus lens, choosing the quick-acting at either of the last two foci, he would have an assortment with which he could "go anywhere and do anything," and in nothing more than in machinery work would he have found the benefit of such a selection.

The camera should by all means be a double swing-back, with the vertical action working *both inwards and outwards*—a necessary precaution to name, as a reference to our columns recently would show. The use of a swing-back will be found in photographing large, unwieldy objects in cramped positions not over well illuminated; a judicious use of the swing-back under such conditions will allow the bringing into good focus of some important but awkwardly-situated portion of the object without the use of a small diaphragm, which would necessitate too long an exposure.

The various and, frequently, most awkward spots where the objects to be represented are placed will be found a constant source of difficulty; but they can generally be overcome, especially with the aid of short-focus lenses. Great care and forethought will, however, be needed to ensure sufficient prominence being given to some particular portion of the machine which, possibly, may have been the chief inducement in the maker to have it photographed.

The alterations in the appearance of an object when shown in perspective must be borne in mind, and especially the relative magnitude of the nearer and more distant objects. We have a lively remembrance of the annoyance felt by an operator at being requested to re-photograph an arrangement of a sort of cast-iron flooring studded with protuberances, and a block, somewhat like a capstan, which was connected with it. The latter came out large and prominent; but the studs of the floor, being represented in perspective, scarcely showed at all, with the consequences we have above narrated. We perhaps need scarcely point out the care which must be exercised in the use of the swing-back when objects of rectangular construction are being photographed. It may happen then that, so far from the swing-back being adjusted so as to facilitate the focussing, it may be needed for the purpose of preserving the geometrical form of the model, when in all probability it will have an opposite effect to that of equalising the focus—just as, in swinging the back of a tilted camera, when a lofty steeple is included the latter is thrown more out of focus, and a very small stop is needed.

When the piece of machinery is taken *in situ* in the upper story of a "machine shop" it will be found advisable to wait till the dinner hour before commencing to photograph, though, of course, the arranging of the camera, &c., had better be done before that time. The reason for this recommendation is that the vibration of the steam engine and machinery will, unless they are stopped, pretty effectually ruin any attempt at taking a negative. The utmost judgment must be shown in making the exposure, as it frequently occupies over half-an-hour, owing to the dim light which generally prevails in such places. It is often well to take a preliminary tentative negative to make sure of this point, as it will usually be impossible to get a second negative. We well remember a manufacturer who employed five or six hundred hands, when asked to allow the engine to be stopped for a few minutes, replying that it meant a loss of time amounting to five or ten pounds in value!

When large surfaces of rough ironwork have to be taken it will be found that they will come out most unevenly and irregularly. To avoid this defect it will be well to give it a coat of paint drying with a dull surface, such as is known among painters as "turpentine flatting." If the circumstances of the case do not permit the application of this permanent surface a temporary one may be obtained by mixing up dry colours with a little old ale, and applying with a brush as usual; a bucketful of water will take off the whole when the photographic operation has been completed. The colour best adapted for the purpose is a slate colour of medium depth.

So important are these matters of surface and colour that we are aware that in one of the large locomotive manufactories of the country it is made a special point to have their engines photographed before the final painting—a ground work of the dulled surface we have described, and of a uniform colour, being first purposely given and allowed to remain till it is photographed.

The chief trouble in pictures of this kind is the almost universal demand to have the backgrounds painted out, and those only who have attempted it know the trouble of such an operation. It is no unusual thing for a negative to take half-a-day's steady workin before it is effectually done, and on this subject we may have some further remarks to make on a future occasion.

We must conclude with some slight reference to the chemicals. All that is in the slightest degree necessary to specially attend to is to see that they are in clean working order. Quick-acting collodion and bath are, of course, most desirable when protracted exposures are given; but even this quality must give way to cleanliness of action of bath and collodion, the two not being very accordant *desiderata;* for the air is generally so full of floating particles, metallic and otherwise, that it is next to impossible to keep the plate out of the sphere of their influence.

We have before us a striking and practical illustration of the readiness with which very rapid plates suffer deterioration from slight errors of exposure; and, as it seems to have a special bearing upon the views we recently expressed on this subject, we need enter into no elaborate explanations in introducing it to our readers. The example consists of a negative, one of a series taken three or four weeks ago in testing the working powers of a lens, though it is only a day or two since the peculiarity we are about to describe came particularly under our notice. In closely examining the several negatives we found over one of them, at a distance of about an inch from one end of the plate, a sharp line running vertically across the picture, the density of the image on that side of the line nearest the end of the plate being considerably greater than on the other side. It was evident that the narrow strip of greater density had received a longer exposure than the remaining portion of the plate, and, carrying our memory back, we recollected that in exposing one of the plates we had commenced to draw the shutter of the dark slide before capping the lens. The knowledge of this *lapsus* came too late to altogether arrest the action, but we were able to quickly close the shutter before, as we thought, any harm was done, probably half-a-second being the exposure thus given to the end of the plate. We find by the memorandum scratched on one corner of the negative that the exposure subsequently given was three seconds with the full aperture of a rapid symmetrical, and this had proved amply sufficient to bring out the detail even in the immediate foreground. The extra exposure stands, it will be seen, in the proportion of 1 : 6 to the correct time—that is to say, the end of the plate received one-sixth more than it should have done; and the peculiarity we wish to point out is that, though in the negative the line can be traced right across the plate, in the print we have before us the difference is so slight in the foreground as to be quite indistinguishable, while in the distance it is sufficient to obliterate the detail, or, to speak more correctly, to obtain the detail in the over-exposed portion the rest of the picture would have to be sadly overdone. We think it must be palpable that, when the sensitiveness is so great that a slight error of this description produces such widely different results on different portions of the picture, something more than care is necessary in timing the exposure; and for ordinary outdoor purposes a reliable actinometer becomes an absolute necessity, to say nothing of the skill and experience necessary to form a correct judgment of the subject to be photographed.

PRACTICAL INSTRUCTIONS IN MODERN PHOTO-MECHANICAL PRINTING METHODS.

Part I.—PHOTOLITHOGRAPHY.

II. Preparing the Transfer.—Having obtained a satisfactory negative of the subject to be reproduced, the next step is to make a print in fatty ink, commonly called a transfer. Very many methods of doing this have been devised and have been worked successfully in the commercial practice of the art of photolithography; but it is quite unnecessary to describe, or even to mention, the greater part of these methods, as, in the case of each of them, success depends principally on the fact of the student thoroughly mastering its details, and making himself so familiar with its difficulties as to apply the antidote to each difficulty almost instinctively. Moreover, every process requires a series of small appliances, which must be ready to hand and in good order if success is to be attained. These circumstances point strongly to the necessity of the student confining himself to one process, where this is practicable; but in these articles it will be necessary to describe two processes, and it will be advisable for the student to employ one or the other of these—not regulating his choice by the dictates of fancy, but selecting that method which is best suited to the class of work he intends to do.

The first method to be considered is specially adapted for those line or dot subjects which are clear, sharp, and well-defined, being at the same time free from greyish lines or anything approximating to half-tone; while the second process is applicable to cases where the bad definition of the finer lines or dots would render their reproduction by the first process extremely difficult.

In order to form the base of the transfer we must select a fine, closely-woven paper which has no great tendency to buckle and pucker when one side is subjected to the action of hot liquids. Either Saxe paper or Rives paper is admirably suited for the purpose, but these papers are somewhat expensive. This, however, will be no great obstacle to the use of one of them for a first trial, and after some experience has been gained a cheaper paper may be substituted.

The paper must now be coated with a thin and uniform layer of gelatine; but it is in many cases a great advantage to cover the gelatinised paper with an extremely thin film of albumen, and this extra albumenous film is of special advantage when very fine subjects are to be reproduced. The solution for the gelatinisation of the paper is prepared as follows:—Six ounces of an easily-soluble gelatine—such as Cox's soup gelatine—are dissolved in twenty-five ounces of warm water, and the mixture is churned vigorously for about twenty minutes. At the end of this time seventy-five ounces of warm water are added, and the mixture is again churned for a few minutes in order to thoroughly mix the newly-added water with the gelatinous solution. While the mixture is being churned it is generally advisable to add three drops of carbolic acid and a quarter of an ounce of ammonia solution to it. The gelatine solution must next be strained through fine muslin, and poured into a flat porcelain dish; this being placed in a tin dish of hot water, which may, if necessary, be kept hot by means of a Bunsen's burner. Immediately before use the solution should be carefully skimmed with a folded strip of paper, long enough to extend right across the dish, and if necessary a second skimmer should be used in order to ensure the absence of any scum or air-bubbles. The solution having been thus made ready, a sheet of the paper is held by diagonally opposite corners and is gently placed on the surface of the solution, the corners by which it is held being lowered last; and it should be allowed to float on the gelatinous mixture for half-a-minute, after which it is hung up to dry. It is well to skim the gelatine solution after the coating of each sheet, as otherwise it will frequently happen that minute air-bells will cause bare places on the paper, and it is a clumsy and unsatisfactory proceeding to float a sheet a second time in order to cover these places.

When the operation of coating is commenced the solution should be tolerably hot—say about 90° Centigrade—and the paper coated under these circumstances will be very thinly coated with gelatine, it being under these circumstances specially suited for the reproduction of fine lines or dots. As the temperature of the gelatine solution falls, and it consequently becomes more viscous, a more thickly-coated paper will be obtained, which will be more suitable for the production of transfers from rather coarse line subjects, such as typographic matter reproduced the same size, or reproductions of manuscript. The operation of coating may be continued until the temperature falls as low as 35° or 30° Centigrade, and if a number be pencilled on each sheet *immediately before coating*, these numbers will indicate the order of floating and the relative thicknesses of the layers of gelatine. If a batch of paper be required to be uniform all through it is merely necessary to keep the temperature of the gelatinous solution uniform. The gelatinous paper must now be thoroughly dried, and it will then be ready either for storing away or for being coated with a thin film of albumen. If it should be decided to do this, the preparation for albumenising must be made as follows:—Six ounces of albumen having been beaten or churned to a white froth, by means of an American egg-beater, is mixed with fifteen ounces of water, and twenty drops of ammonia are added. This mixture is now allowed to subside for two or three days, when the clear part is poured off and carefully filtered into a flat dish. The sheets of gelatinised paper are now floated on the albumen solution, just as they were previously floated on the gelatine solution, and in drying special care should be taken to avoid dust.

The paper thus prepared, whether simply gelatinised or gelatinised and albumenised, will keep well if preserved in a dry place, and a stock should always be ready at hand for sensitising when required.

Professor Husnik has introduced into the market a double-coated photolithographic paper, similar to that described above, and many will prefer to purchase this instead of preparing their own, as Husnik's paper is very carefully coated, and gives admirable results.

For sensitising the photolithographic paper the most convenient preparation is the alkaline sensitiser recommended by Husnik, and prepared as follows:—One part of ammonium bichromate is dissolved in fifteen parts of water, and four parts of alcohol are added, after which sufficient ammonia must be mixed with the solution to give it a decidedly ammoniacal smell. This solution should be kept in the dark, and when required for use the clear portion should be poured off into a flat dish, care being taken not to disturb the deposit which forms in the liquid. The paper to be sensitised should then be held by two corners, and it must now be rapidly and steadily drawn through the solution, the coated face being uppermost; and in pinning it up to dry care will have to be taken to prevent any little streams of the solution running back over the face of the paper. Small pieces of blotting-paper should be next attached to the lower edge of the paper in order to absorb the drainings; and the drying ought to be conducted rapidly and in a current of air, the most advantageous position for the paper being a little distance above a horizontally-placed stove-pipe. It is scarcely necessary to add that during the sensitising and drying the greatest care should be taken to exclude actinic light, as a very slight exposure is sufficient to bring a host of troubles in its train.

The whole operation of sensitising and drying the transfer paper can easily be performed in an hour or an hour and a-half, and only just the quantity of paper which is required for immediate use should be sensitised at one time, as it rapidly deteriorates after sensitising, especially in hot weather.

Printing-frames for photolithographic work should be provided with screws rather than with springs, and if the bars which bear these screws can be moved to any required part of the frame so much the better, as the pressure is more subject to control under such circumstances. Care must be taken that the frames, negatives, pads, and everything else concerned in the printing are thoroughly dry when used, and if these appliances are slightly warm when used so much the better.

The prepared paper having been placed with its face in contact with the negative, a sheet of very thin patent plate, rather smaller than the negative, should be placed behind it. At the back of this the usual felt pad and a rigid back must be fixed down tightly by means of the screws. Matters being thus arranged an exposure of about two minutes in the sunlight or twenty in diffused light is required; but, of course, this exposure will vary much according to the state of the weather and the negative which is being employed. It is best to regulate the exposure by an actinometer, the most convenient form being the ordinary cube actinometer known as the "autotype" or "Johnson's" actinometer.

When the printing is conducted by diffused light it is well to fix the frames a little distance inside a window, so as to cut off the most oblique rays, and thus lessen the evil effects of any want of contact between the negative and the sensitive paper. The lime light, the electric light, or the light of burning magnesium may be employed with advantage when it is desired to make a transfer in the evening, the exposure, in either case, not being inordinately long. When the simply-gelatinised paper is employed a rather longer exposure is required than when the doubly-coated paper is used, especially when a very soluble gelatine has been employed for coating it.

The paper, having received the necessary exposure, is removed from the frame and carefully examined, in order to ascertain if any lines are not sharp in consequence of imperfect contact, when, if any lines should prove to be ill-defined, it is best to reject the transfer at once and to make another. But if, on the other hand, the whole subject should consist of well-defined and clear brown lines on a bright yellow ground, proceed to the inking of the transfer. For this purpose dissolve equal parts of typographic ink and middle lithographic varnish in sufficient oil of turpentine to make a mixture having the consistency of cream; and by fastening a piece of fine muslin over the mouth of the bottle containing this mixture a convenient filter is made, through which some drops of the mixture can be drained out on to a slab of plate glass or slate. Now take a dabber, which may either be made of rag or of the glue and treacle mixture used for typographic rollers, and spead the ink equally over the slab. When this has been done the next thing is to evenly coat the exposed surface to the transfer paper with a thin film of the ink. For this purpose it is convenient to clamp it down on a piece of plate glass by means of four strips of reglet and some American clips, and then to apply the dabber softly and patiently. No pains should be spared in using every endeavour to obtain a thin and uniform film of the fatty ink, and the progress of the operation can easily be watched by lifting up the plate glass and looking through it. Under these circumstances the film of ink should appear greyish and uniform, and any thick or uneven places must be treated with the dabber until they are made to range with the rest of the film. During this operation a few drops of turpentine may be worked up with the ink remaining on the slab, as occasion may require; or if the film of ink on the transfer appears very lumpy and uneven it may be cleaned off by means of a rag and a few drops of turpentine, and the operation of inking can then be recommenced. In doing all this, however, care must be taken that no ink reaches the back of the paper.

The face of the transfer being now coated with a thin and uniform film of ink, quite free from any dense patches, it is next removed from the plate glass and hung up in a warm place for a few minutes, in order to allow the remaining trace of oil of turpentine to evaporate; but all this time the transfer must be carefully screened from actinic light. After this the transfer should be placed in a dish of cold water, where it ought to remain for ten minutes, or longer, in order that it may become thoroughly softened and ready for development with the brush, and from this point the operations may be conducted in white light.

The transfer being now thoroughly softened it is laid, face upward, on a piece of plate glass, which inclines down into a dish of cold water, and it is then softly brushed with a broad camel's-hair brush, care being taken to keep an almost constant stream of water flowing on the paper, in order to prevent as much as possible actual contact between the hairs of the brush and the inked face of the transfer. During this operation the ink will become detached from the unexposed parts of the transfer, and some of this ink will tend to pile itself up on the broader, exposed lines, while the finer lines will just retain the amount of ink originally put on by the dabber. So it will be seen that in inking a transfer which is to be treated by the above-described method, one ought to put on just the amount of ink which is required by the fine lines, thus leaving the broader lines to become intensified during the development.

Under favourable circumstances the delicate operation of developing a photolithographic transfer may be completed in five or ten minutes; or it may require a much longer time, especially when those parts of the subject which consist of fine lines closely packed together require local treatment with a small camel's-hair brush. It may occasionally happen that it will be necessary to use slightly-warm water in order to soften the transfer sufficiently, especially when a simply-gelatinised paper is employed; but when this is done care should be taken not to use the water too hot, a long soaking in moderately-warm water being preferable to a shorter treatment with hotter water. When a careful examination shows that the transfer is satisfactorily developed, it should be well rinsed with abundance of water, in order to remove any loose particles of ink, and it should then be dried between folds of blotting-paper, care being taken not to put the rough side of the paper next the inked face of the transfer, nor to use too much pressure, lest fibres from the blotting-paper should adhere to the image and mar the solidity of the lines. After having been dried between folds of blotting-paper the transfer should be pinned up in order that it may become a little drier than the blotting-paper leaves it, and generally a period of five or ten minutes is sufficient for this; but the exact degree of dampness which it should possess when transferred to the stone is only to be learned by experience. The brushes employed for developing the transfers must be carefully cleaned with oil of turpentine immediately after they have been used, and the turpentine should be allowed to evaporate completely before the brush is employed for the development of a second transfer. Benzole is more convenient for cleaning the brush when it is required again immediately, as this solvent can be dried off in a few minutes.

Before entering into lithographic details, and describing the transference of the fatty image to a stone, it will be well to treat of the second method of making a transfer, this second method being especially adapted for use in those cases where the nature of the subject renders it impracticable to obtain a negative in which the fine lines are as vigorous and clearly defined as is desirable. Even when this second method of making a transfer is employed the shading at the back of the negative should be performed as already directed.

T. Bolas, F.C.S.

PHOTOGRAPHIC EXPERIENCES IN PARIS.

[A communication to the South London Photographic Society.]

Our worthy President has often reminded us that the proceedings of the South London Photographic Society are not so formal as those of the Parent Society, and which fact he characterises as the great element of our success, as it encourages those who feel somewhat diffident when addressing a meeting. Our indefatigable Secretary, always on the look-out for something to keep us alive, pounced on me, thinking I must have something to impart after my recent trip to Paris. I should not have appeared before you tonight had I not derived some little experience on a subject which appears to be absorbing much attention. I allude to the gelatino-emulsion process, which has now taken a fresh start. I am not an experimentalist, and possibly should not have adopted it had not circumstances compelled me to do so. I purpose showing you on the screen some of my results with both wet and dry plates, that you may form some idea of the comparative merits of both. Previous, however, to doing this I will give you my opinions of the best way to get to Paris, the arrangements for working there and in the Exhibition, and lastly show the views, which I hope may lead to an agreeable and useful discussion.

Routes.—For those who suffer from sea sickness the route *via* Dover and Calais is the best, the voyage being under an hour, and the steamers more commodious. The departures are always at fixed periods, and the arrival in Paris convenient for dinner. For returning I prefer the tidal service, *viâ* Boulogne and Folkstone, if the departure from Paris is about ten o'clock, a.m., as it enables you to get away more comfortably, and the later arrival home is not of so much consequence as in Paris, where there is some doubt of your getting the accommodation you anticipate, and being then obliged to accept what offers. By the route *viâ* Newhaven and Dieppe there is a tidal service, but on certain days the voyage is performed in three and a-half hours, and the whole journey about the same time as the Dover and Calais route. The new steamers are most commodious and rapid; second only to the Holyhead and Kingstown line. This route is always the most crowded during the summer season, being a little more than half the expense of the South-Eastern and London, Chatham, and Dover routes. A first-class return for a month is £2 15s. as against £4 15s. on the other lines. Let me advise you to avoid the cheap night service of eighteen hours by either route; and if you wish to be economical take a second-class ticket by the day service. I have tried various routes, viz., Southampton to Havre, by the Seine to Rouen, and from London Bridge to Boulogne, and thence per *diligence*. If any of our friends are bicyclists I cannot speak too favourably of the French roads—they are magnificent, being constructed for military purposes, and kept in splendid condition.

Advice.—Ask the guard which side you get out to embark, rush on board, and deposit your hand parcels on the most comfortable seat on the poop looking aft, and if you wish to go below secure a couch by depositing a parcel on it. Then you have time to look about, as passengers observe the arrangement of priority. Again: when you disembark inquire which is the gangway, collect your parcels, and rush to the train to secure a window seat. On arrival in Paris secure a cab the first thing, deposit your hand parcels in it, receive a ticket from the driver, who will fall into the rank whilst you return to look after your heavy baggage, which you ought to register, as it removes all anxiety *en route*, and the cost of which is one shilling. Cab fares during the day time are always the same—1*f.* 50*c.* for one having two seats, and two francs for one with four seats, with twenty-five centimes for *pour-boire* or "drink-money." There is but one charge, whatever the distance, inside the fortifications. When I travel in England I generally send foward my luggage per goods train, to avoid the trouble of looking after it. I did the same thing in going to Paris, which caused me an immense amount of trouble. There was first the delay of ten days, and again the loss of one day in passing it through the octroi. I consigned mine to a French house I do business with, and they endorsed the bill of lading, and sent one of their clerks with me. The first hitch was the omission to get the authority from the firm to make the declaration. When he returned he found business suspended for over an hour for *déjeuner*. We followed suit. The delay in getting my photographic apparatus from England enabled me to visit all the places I intended photographing, noting the best hour for that purpose, and getting the necessary permissions, which are numerous.

1. For street work you place yourself under the surveillance of the police.
2. For the national palaces and public works you must apply to the Minister of Public Works.
3. For the national fine art galleries you have to apply to the Minister of Fine Arts.
4. For the municipal parks and squares application is necessary to be made to the Prefect of the Seine.
5. For the churches to the *curés* or architects.

Photographic manipulation in Paris is much the same as here. There appears to be a much greater number of outdoor workers there than in London. Most of the best portrait photographers undertake outside work, and execute it themselves. The larger number of the houses have court yards; and, if there be a studio on the top, you will generally see a dark box on wheels at the bottom.

I cannot speak favourably of the Parisian apparatus. It is a common thing to see a studio stand and camera on the street, the lens fixed into a rigid front, and the camera cocked at such an elevation as would make an architect shudder when he saw the converging lines. This does not apply to all. The appliances of such houses as Braun, Levy, Lachenal, &c., are most complete. I have noticed most unique camera-stands eighteen feet high, the legs forming a ladder for going up to the camera.

The number of street workers being so great the prices are very low. Cards sell from ten to twenty-five centimes, and cabinets and stereos. at half-a-franc.

The regulations for street-working, since the Franco-Prussian war, are very complicated if enforced; strictly speaking, you are not allowed to photograph in any of the twenty-two *arrondissements* of Paris without the special permission of the four commissioners of each. I had a friend who was an old school-fellow of the Prefect of Police, and through him I got a general order for all, which saved me a large amount of trouble.

There are advantages connected with such disadvantages. You take up your position with the sanction of the police, and in a measure under their protection. I never ventured to rely on this to the extent that French photographers do, who I have seen leave their cameras in the middle of crowded thoroughfares whilst away developing. Many of you no doubt are familiar with the position of the Grand Opera House. To take a photograph of this it is necessary to place the camera exactly in the middle of the Avenue de l'Opera, which is about as crowded as Regent-street in the forenoon. When I was focussing for this view I was in dread of being run over, although beside me stood a large camera which a Frenchman was working with the greatest composure, leaving his camera uncared for during long intervals. I found him at work there, and left him with his large negatives on the pavement leaning against the wall of an unoccupied house. The Porte St. Denis is situated in a very crowded thoroughfare. I was taking it on a cloudy day, with occasional sunshine. After waiting some time the sun shone out, and I put the camera-back against the kerbstone whilst I went into the middle of the road to focus; but when I went to fetch it I found it open and the film partly rubbed off. I heartily wished the person who was so inquisitive had on white kids. I had to wait a long time before the sun shone out again, when I then succeeded in getting a nice negative. This was the most trying job I had.

The facilities for working in the streets are very great—wide pavements and low trees, giving room for the tent and shelter from the sun. The atmosphere is very clear, allowing subjects to be taken with much better effects of light and shade than in London, where the atmosphere is very perceptible if the sun be shining very much to the right or left of the subject to be photographed.

Red-tapeism is more rampant in France than here. A gentleman told me that he was taking a photograph of the July column, which is situated in a large open space. He had permission to work in the 4th *arrondissement*, but it was necessary for him to take it from the 12th—the other side of the boulevard—when he was stopt by the police, who would not allow it without an order from his chief. I had an order from the Minister of Fine Arts to do interiors at the Grand Trianon. The day being calm and favourable for outside views, I decided on doing these first, when I was stopt by the Registrar of the Palace, who said he could not allow it without an order from the Minister of Public Works. I went back to Versailles, hoping to find some one there at the public works department to endorse my order. I got it done by the Registrar of the Palace and returned, but it was no use. Monsieur Monavon was inexorable. He said he recognised no one but the Minister of Public Works. This was a great disappointment, as I wished to do it before the foliage got too heavy. The weather prevented my going again until the trees were fully out, and so prevented my taking many charming little "bits" I had looked out. I was working in the Bois de Boulogne when a heavy thunderstorm came on, which prevented my working for two hours. I set up the apparatus, and was just in the act of exposing when one of the park rangers came up and asked for my authority, which I produced. He stated that I must not work after twelve o'clock. I remonstrated, and told him that it was not so stated in the order. He said those were his instructions, and he would not allow me to expose until I had a special order from his chief to work later. This I had to do, which took half-an-hour; but in the meantime it had become overcast again, and I had to wait two hours longer for the sun to accomplish it.

I will not here attempt to describe the *modus operandi* of the emulsion plates; I will do that when using the screen. The cause of my being compelled to employ them arises from the dreadful mess made by French operators in copying the pictures in the Louvre by the wet process. M. Ferrier's operators did the same thing here at Windsor Castle and Buckingham Palace, which has almost shut out English photographers from obtaining permission to photograph in the royal palaces. When taking a photograph of the grounds and Trocadéro from the gallery of the Exhibition, which is reached by a staircase of about sixty steps, I once followed a French operator, and, noticing frequent droppings from his dark slide. I reckoned eleven drops in going that distance. I was often surprised at the messes made about the building being tolerated.

The great object of my going to Paris was the open privilege to work in the Exhibition, but as it was in such an unfinished state I resolved to do all the outside work first, and make this series the last. There was very little difficulty in obtaining permission to work until ten o'clock, but some trouble to get the time extended until five o'clock. I will not attempt to describe the beauties of the park and Trocadéro and grounds—the whole being magnificent. The exhibition building, for internal grandeur, is far behind our Crystal Palace, or the 1862 building with its grand nave and transepts. There was not a single place where a comprehensive view could be taken, so that the photographs bear no comparison to those of our 1862 exhibition. There were a great number of workers; I have reckoned as many as twelve at work in the Rue des Nations, this being the most favourite spot, and one where the police did not interfere. Their instructions were not to allow anything but general views to be taken without the written permission of the owner. Many very pretty views could be taken in the grounds. I will not allude much to these tonight, as the object of my appearing before you on this occasion is to talk about dry and not wet plates. All the work I did in the Exhibition was by the wet process. There were a number of dry-plate workers. One operator told me that he had exposed sixty tannin plates in a day.

I will now proceed to show the views on the screen; but, before doing so, I should like to remark that if we have our popular lantern evening at Christmas I shall be pleased to exhibit the whole Exhibition series. F. York.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

If I were M. Liébert, of Paris, I would do two things in connection with his elaborate book, which, I observe, has recently been reviewed in these pages. First, I would lose no time in securing for the work a new title, and one which would convey a more accurate idea of the nature of the book than the misleading *La Photographie en Amerique*, that forms the leading feature in the name or title of the work, which is in reality, and as the second portion of its designation declares, *Traité Complet de Photographie Pratique*. I offer, therefore, as a suggestion given in all meekness, as becometh one who meddles in a matter with which he has nothing to do, that the "top-knot," the "scalping lock," as it were, of the title should be discarded, because it is not "American," but *European*, or even cosmopolitan, photography which is therein treated. What would be thought of Dr. Monckhoven were he to issue a new edition of his invaluable work on the optics of photography, under the title of *The Lenses I Saw Used in Little Pedlington, being a Complete Treatise, &c.?* Now, I do not for an instant seek to compare the Blankshire borough just named with the two of the *five* "quarters" of the globe which give a local interest to the title of M. Liébert's goodly volume; but it will be admitted that the principle is similar in both cases. My second proposal would be to publish the work in English, which is the language commonly spoken both in this country and in *North* America, to which portion of the new world M. Liébert's title makes special reference, I suppose.

In one of the ever-interesting "Answers to Correspondents" which are to be found in the pages of The British Journal of Photography occurs the following *dictum:*—"Gas-bags are destroyed quite as much by the chlorine present with the oxygen as by the oxygen itself." This reminds me of the rapid approach of the time in which gas-bags are made more use of than at any other period of the year. Those who possess lanterns, or, more properly, those who exhibit pictures by means of the lantern, may be divided into two classes, namely, those who do so at their own residences, and those who "itinerate." To the former I recommend most strongly the adoption of a metallic receiver instead of a gas-bag. It does not cost much more, if made of thin galvanised sheet iron; indeed, I have seen a most effective gas-holder made of common tinned ware, and it is in accordance with my experience that, after having been three years in more or less constant use, it is in apparently as good condition as when it was new. To preserve a gas-holder of this kind from the ravages of time and oxygen, accelerated by the moisture necessarily present, it must be carefully varnished. The best varnish, by far, for such a purpose is a thick solution of the etching-ground made use of by copper-plate engravers, applied as a paint to the metal, which should have previously been made slightly warm. For the itinerant exhibitor a gas-bag proves more handy than anything else. It is inconvenient to carry the bag full to any considerable distance, and it is often inexpedient to make the gas just previous to giving an entertainment; but by compressing a quantity, say six feet, of oxygen in a small tubular receiver, it may be easily carried about, and just before commencing the display of pictures may be discharged into the bag from which it is to be used. In spite of all that has been written on the advantages of using compressed oxygen direct from the reservoir many give the preference to bags, as being more manageable.

What, I wonder, is to be the nature of the technical examinations which photographic candidates for the supreme felicity of competing for a five-pound prize, given by the Society of Arts, have to undergo, and by whom is the examination to be conducted. I do not think it to be at all likely that the "Peripatetic Photographer" will be called upon to be examiner-in-chief; still, in these days of marvels, there is no saying what may happen. Hence I have taken time by the forelock, and have roughly jotted down a few of the queries which I, as technical examiner in photography, may put to the aspirants for honours and pounds sterling:—"What new properties does protosulphate of iron acquire by becoming oxidised by exposure to the air?"—"Mention the reaction that takes place when an iron developer is applied to an exposed plate upon which is a portion of solution of nitrate of silver."—"Explain the apparent contradiction in terms in speaking of alkaline pyrogallic acid."—"What would happen if three ounces of teriodide of nitrogen were pounded in a mortar with one ounce of iodide of potassium?"—"If a photographer accidentally swallowed bichloride of mercury, or was overcome by fumes of cyanogen, what steps ought he to pursue?"—"In what manner does hyposulphite of soda fix a print? and what are the grounds upon which its use is so much dreaded by photographers?"—"What is the effect of the impact of a ray of light upon a silver haloid?"—"Give a formula showing what takes place when a neutral negative bath becomes acid by continued use, owing to the employment of a collodion containing free iodine."—"Can you account for the insanity of those photographers who apply the term 'redeveloping' to the act of intensifying an image?"—"What is negative aberration in a lens? and is there any connection between it and polarisation of light?"—"Suppose a lens to be under-corrected for colour, how would you rectify it so as to make the chemical and visual foci coincide?"—"What are the lenticular conditions for securing freedom from distortion?"—"What is the precise degree of difference between ferric and ferrous oxalate? and *why* does the latter reduce the salts of platinum?"—"*Why* does red hair show so much darker in a photograph than it appears to the eye in nature?"—"If, when taking a portrait, your sitter insists upon dispensing with that horrid head-rest, when you know that otherwise she cannot keep her head motionless, what would you do?"——These afford a clue as to the kind of queries that *may* be put to the candidate who is being examined in photographic technology.

* Concluded from page 473.

VARIETIES.

[A communication to the South London Photographic Society.]

At the pressing request of our worthy Secretary to supply a paper for this evening (who seems, by-the-bye, to experience considerable difficulty in getting members to energetically respond to his invitations), I have endeavoured to prepare one, although I am afraid it will be somewhat of a desultory and mixed character, for the difficulty of selecting a subject that will, in addition to being interesting and practical, possess the charm of novelty, is a task more than I feel competent to perform; still, rather than our opening session should be entirely paperless, I have endeavoured to string together a few topics that may be suggestive, or provocative of discussion, if nothing more.

Well, then, to begin. This very difficulty of providing papers should certainly be a subject calculated to interest *every* member of this Society, and, instead of our Secretary being driven to his wits' end to get them, he ought to be supplied with not only one paper for an evening, but *several*, thus having others to fall back on in the event of the promised reader "not coming to the scratch." The paper question has, however, been much talked of amongst us, but, it seems, has not advanced a stage further than the discussion. I would therefore suggest, if papers *cannot* be obtained from members of the Society, a series of subjects should be selected by us, and a competent man outside our Society requested, for either love or money, to write a short paper, on a subject we name, that could be read by our Secretary in the event of none being provided by our own members; for I apprehend little or no interest can attach to our meetings if we have nothing special to listen to or discuss. The result will be that at no very distant date this, at present, flourishing Society will die of sheer inanition; but it is to be hoped, numbering, as we do, so many practical men amongst us, that such a fate will be postponed for many years. It will, however, require something more than a passive interest to sustain its vitality, and I hope to see in this session, upon which we this evening enter, many unmistakable signs of continued energy and usefulness, and that every member will do or say something to sustain its credit.

Now to change the topic. The blistering of prints on albumenised paper seems to have been more than usually prevalent in the past summer, and more than one well-known writer has suggested that it is caused by the excessive dryness of the paper previous to sensitising, and that if the paper be left some time exposed to a moist atmosphere the evil will disappear. I regret I am not able to coincide in this theory, as I have found that paper kept in a cool and slightly moist atmosphere will blister just as much as if it were dry. Having, as I have, to superintend the preparation of thousands of sheets monthly, I find no precaution will entirely prevent some samples of paper from blistering, although by observing certain regulations the evil can be mitigated. It is a mistake to think that if blisters disappear on drying the proofs are none the worse, as it will be found such proofs will become spotty and imperfect much sooner than those which have not been afflicted with this complaint. Whatever may be the cause it is evidently connected with the preparation or albumenising of the paper. It may be due to the sizing, or it may be that the albumenising is too rapidly conducted, the albumen not being allowed time to thoroughly attach itself to the surface of the paper before it is removed and hung up to dry; but whatever the cause, it is outside the processes to which it is subjected by the photographic printer, namely, sensitising, printing, toning, fixing, and washing. A certain remedy—but, unfortunately, rather impracticable when large quantities of work have to be done—is to pass the toned print through a bath of methylated spirit, which entirely removes the tendency to blister, without in any way injuring the proof.

Again, to change the topic. The alkaline toning bath is the toning bath, perhaps, more generally in use than any other. I allude to lime baths. I shall, perhaps, surprise some when I say that this so-called alkaline bath will work better if it has an acid reaction on litmus paper. It may not be generally known that the effect of very weak acid upon the colour of litmus paper is much more readily observed when the effect is watched by gaslight than by daylight, and litmus so slightly changed by acid as to be imperceptibly altered by daylight is quite pink when examined by gaslight; and I have found lime toning to progress much more satisfactorily if the solution will change litmus slightly pink when examined under these circumstances than if it be neutral or slightly alkaline.

Again, another topic—clean hands. It is much more easy to keep them from being stained than to remove stains when made. The remedy is—*care* and *dexterity* in manipulation. Some manipulators could not, I believe, if their very lives depended on it, avoid making themselves in a mess, or get through a day's work without having hands as black as if they had been intentionally dyed. I don't think they would be happy or think themselves photographers if they did not succeed in making themselves grimy and untidy. I would recommend the use of a pair of good dog's-skin gloves, well rubbed with warm wax or paraffine, as being comfortable to wear and effectually keeping the fingers clean. India-rubber gloves answer the purpose very well, but some are very unpleasant to wear. I mention this subject, not so much to call attention to appearances as to its affecting the health of the operators; especially now, as the cold weather is approaching, the skin becomes more hard and inelastic and more easily abraded than in warmer weather, when it is soft and pliant, and is consequently more likely to be injured by chemicals inducing dangerous or, at least, troublesome sores. I quite believe that the eruptions upon the hands we hear so much about might be entirely avoided if the operator were rather more imbued with the spirit of economy and manipulatory neatness. For my part, I always look on so many stains as so much wasted material, and if this feeling could be realised by those engaged in photographic operations it would be a general benefit both to employers and employed.

Once more to change the topic. Respecting landscape photography: in general landscape subjects no good results can be reasonably expected unless the sun shines. Sometimes a special view may, perhaps, be better taken on a dull day; but in the majority of instances plates exposed without sunshine are plates spoiled. I fancy, from the little experience I have had, this rule is especially applicable to slow dry plates, or plates several times slower than wet ones, the beauty of the photograph depending, as it does, less upon the beauty of the composition as seen with the naked eye than upon the illumination of it. One has only to watch the effect of the light on some subject with and without sunshine to at once realise the difference and importance of having the landscape well lighted. A weed, a bunch of leaves, or some trifling object that on a dull day is scarcely noticeable will, with a touch of sunlight, spring into importance and completely alter the character of the view. Photographic beauties lie hidden in the most unsuspected localities, and are systematically overlooked in the idea of the necessity of going to some place of artistic repute to be enabled to procure pictures worth the trouble of taking. How often such trips, made on the representation of a friend who has an eye for colour, end in a disappointing fashion to the photographer I need not say; therefore I would impress on all incipient photographers—and others, too, for the matter of that—to thoroughly acquaint themselves with the effects of light and shade before they indulge in landscape work, as it is quite as important to be understood in this department as by the portraitist. In these days a photographer who has no proper ideas of lighting the sitter would be laughed at, and his work properly despised; yet, I believe, lighting the landscape is by many little considered, or not at all. If the sun shine, that fact is held sufficient; as to where it shines, and what it lights up or casts into shadow, is hardly thought about so long as it does not shine into the lens. This is a happy-go-lucky style of working that occasionally makes a good picture by a fluke, but a great many bad ones; and, as the principle on which to go is not understood, the probability is that a special success could never be duplicated unless by a rare chance.

I have now arrived at the last item on my list, and, if I have said nothing new, the subjects I have touched upon more or less affect all photographers, and force themselves into prominence in the practice of all the disciples of the so-called "black art." I will therefore leave this collection of *Varities* to your consideration, and hope it will be sufficient to induce a discussion for the evening and papers for future ones, one of which I would suggest should be a practical exposition of the development of *over-exposed* and *under-exposed* dry plates, by some good dry-plate worker.

Edward Dunmore.

ON NITRO-GLUCOSE.*

The Employment of Nitro-Glucose by Direct Addition to the Collodion.—I now arrive at the most important point for the photographer—the use which may be made of nitro-glucose by mixing its alcoholic solution with collodion. According to my experiments, by adding one part of nitro-glucose to four parts of pyroxyline prepared at a low temperature we obtain an emulsion giving an image of extraordinary intensity; in certain cases it will perhaps be advisable to diminish slightly the proportion of nitrated sugar. Knowing the proportion of pyroxyline contained in the collodion, and also of nitro-glucose in a given volume of alcohol employed to dissolve it, it will be easy, by a simple calculation, to ascertain the number of minims of alcoholic solution corresponding to one grain of nitro-glucose. This quantity of solution must be added to the collodion a few drops at a time, shaking the bottle vigorously. This operation (which may be performed in full daylight) completed, we enter the dark room and add the nitrate of silver solution, then the bromide of zinc, and so on with the remaining operations appertaining to the preparation of an emulsion. I may make one important observation—that emulsions containing nitro-glucose, as well as those prepared from high-temperature cotton, require a less quantity of *aqua regia* in order to leave the same excess of silver as in an emulsion without nitro-glucose. Thus, for instance, I have found that in using the same collodion and the same proportions of silver nitrate and of zinc bromide that it was necessary, in order to leave a slight excess of silver nitrate, to add four c. c. of *aqua regia*, whereas with the addition of nitro-glucose the proportion of *aqua regia* was reduced to 3·2 c. c. or 3·3 c. c. With 4 c. c. I obtained an emulsion with excess of *aqua regia*, for the distilled water employed in precipitating it became clouded by the addition of solution of silver nitrate. This fact can only be explained, it seems to me, by supposing that the combination which the nitrate of silver added to the collodion contracts with the nitro-glucose is more intimate than is generally supposed, and that it is not destroyed, at least immediately, by the *aqua regia;* and, in fact, emulsions made with the preliminary addition of nitrated sugar, even though prepared with excess of *aqua regia* and subsequently washed, gave the same density as those prepared with excess of silver.

Better than any description, the negatives I lay before you will enable you, by a comparison of results, to appreciate the enormous difference in density which exists between the two halves of each plate representing the same view, with an exposure rigorously the same, the camera being a binocular. One half of each plate was coated with emulsion without nitro-glucose, the other with an emulsion in every way similar save that it received an addition of nitro-glucose in the proportion indicated. You will remark the almost total opacity of the sky, the vigour of the high lights, and the clearness of the details in the shadows, and this without the production of a hard negative. It is advisable always, when from the nature of the subject it is not desirable to obtain an image of great density, not to push the development too far, which enables us to obtain pictures of much greater purity and fineness than with emulsions containing no nitro-glucose. The pictures obtained with the latter emulsion, as you will remark, appear to be more harmonious,

* Concluded from page 476.

but it is easy to see that this is solely due to the want of intensity; and as we attempt to remedy this defect by prolonging the development or increasing the quantity of pyrogallic acid, the images obtained become less clear and delicate, presenting a flat appearance, and eventually commence to fog. In order to avoid this latter result several authors, notably Captain Abney, recommend the cessation of the alkaline development as soon as the details have made their appearance, to wash the plate, and then proceed to intensify with the ordinary mixture of pyrogallic, citric, and acetic acids and nitrate of silver. The use of nitro-glucose dispenses with this complication of the manipulations, which, besides, is far from producing uniformly the result expected from it.

The examination of this negative, one half of which is from an emulsion prepared with high-temperature cotton and the other with nitro-glucose emulsion—giving, as you see, an identical result—proves afresh that the intensity of collodion is really due to the presence of nitro-glucose.

Besides its *rôle* as an intensifying agent nitrated sugar also appears to confer upon newly-prepared emulsions many of the qualities they acquire by age, such as increased sensitiveness, detail in the heavy shadows, and images which develope more rapidly and are less subject to fog either by prolonged action of the alkaline developer or by over-exposure. With a view of showing you the influence which age exercises upon emulsions I submit to your notice another negative the respective halves of which were covered with emulsions prepared with identically the same materials and in the same proportions, but one was newly prepared, the other two months' old. It is easy to see that the image produced by the latter emulsion is more vigorous and more perfect in the shadows than the other.

The Functions of Nitro-Glucose.—Having regard to the probable composition of nitro-glucose, we cannot but suppose that, in connection with nitrate of silver, it plays the part of a reducing agent, and that, in fact, the nitro-gluco-argentic precipitate remains unaltered so long as it is preserved in darkness; but in the presence of light the reducing action is not long in making itself manifest. There is further reason to suppose that under the influence of actinic rays the nitrated sugar is decomposed, and that the product which comes of the decomposition reduces in its turn the salt of silver. What appears to me to confirm this view is that the nitro-gluco-argentic compound in the presence of ammonia produces a reduction of metallic silver even in the dark. Doubtless the first phase of the action of the ammonia is the decomposition of the nitro-glucose into a substance which in time reduces the silver. Be this as it may, the increased density produced by emulsions containing the nitro-gluco-argentic compound is evidently due to the combination of the silver reduced by the action of the alkaline developer upon the silver bromide with that arising from the reduction of the compound in question.

In conclusion, gentlemen, I take occasion to remark that I am not the first who has sought to utilise the properties of nitro-glucose. Many years ago Dr. Monckhoven endeavoured to apply it to the preparation of paper destined for enlargements in the solar camera. In his *Treatise on Photography* he attributes the decomposition which collodion undergoes by age, as well as the property it acquires of giving dense images, to the formation of a certain quantity of nitro-glucose. I believe him to be correct, and here is a fact which seems to confirm that view:—A short time ago the manager of one of our principal establishments for the sale of photographic materials showed me a substance he had obtained under the following circumstances:—Having noticed that a sample of cotton which had been kept for about a year hermetically closed in a stoppered bottle had become extremely powdery he thought to utilise it in the preparation of an emulsion; but, as the bottle was filled with red nitrous vapours, he considered it desirable to submit the cotton to a preliminary washing. Accordingly it was placed in a funnel and a stream of water poured upon it, when, to his astonishment, the pyroxyline was converted into a gummy liquid, which flowed through the neck of the funnel into the lower bottle. I recognised in this substance nitro-glucose, for in its reactions it exhibited all the characteristics of that substance. It is, then, an undoubted fact that pyroxyline undergoes by age, and under the influence of certain conditions, a change which converts it into nitro-glucose.

Capt. Abney, in his two treatises, has also a few words to say about this substance. He, too, conceived the idea of adding it to collodion, and found that the images obtained were of extraordinary density; but he adds that, so far, practice has not confirmed its use. In other portions of his works, too, he notices the addition of gelatine to the pyroxyline after the manner of Warnerke, or, better, to the washing water of emulsions recently precipitated by means of a strong solution of tannin or salicine, with a view of remedying their lack of intensity.

Though it is true that these two eminent writers have already drawn attention to the properties of nitro-glucose and the uses to which it may be put, I believe, at least, so far as emulsions are concerned, I am the first to attempt to introduce it into actual practice. Henceforth it will be no longer necessary to have recourse to high-temperature pyroxyline; any collodion prepared from ordinary low temperature cotton (provided it be of a nature to resist the precipitation and washing) will be invested, with the greatest ease, with all the valuable qualities of high-temperature cotton by the mere addition of a small quantity of nitro-glucose. In view of a result which has so important a bearing upon emulsion processes I thought the subject worthy of bringing under your notice.

M. DE PITTEURS.

OPINIONS OF THE LONDON DAILY PRESS ON THE PHOTOGRAPHIC EXHIBITION.

THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The annual Exhibition of this Society is to be opened today, a preliminary view having been held yesterday. The photographs, which are numerous and in most instances of a high class, are exhibited in the Gallery of the Society of Painters in Water-Colours, at 5A, Pall Mall East. Among the exhibitors of this year, who number about one hundred, are to be found some of the best landscape photographers, both professional and amateur. In fact, the Exhibition may be said to shine especially in landscape photography, which together with landscape art appears to have taken the first place in England, while the supremacy both of drawing and of photography of the figure have remained with the Continent. There are not a few examples, however, of figure photography which show a high order of merit. There are in the room many photographs of well-known personages, which in their clearness of outline, and also their softness and delicacy of shading, would be by no means contemptible beside some of the best results obtained in Vienna, St. Petersburg, or Paris. Some of the most noteworthy examples are in enlargements, albeit enlargements are held to be purely mechanical effects, and are not highly esteemed on that account in the photographic world. It cannot fail to be interesting to see what the small negative does in reality produce when the picture is transferred to a larger plate. The fidelity with which every minute detail is reflected is strikingly shown when the enlarging process is gone through; and no better example can be found than the comparison of some of the large photographs of animals with the small ones printed from the original negative. Some very excellent specimens of enlargements of portraits are to be seen in the portraits of Mrs. Langtry, Mr. Hook, R.A., Mr. Henry Irving, and Mr. H. J. Byron. It is in landscape, nevertheless, that the great merit of the Exhibition lies. Many very beautiful photographs are here to be seen which have been taken with the wet plate, but it is being admitted that this must eventually cede its position to the emulsion or dry plate; and, indeed, if any one needed actual proof of the superiority of the new process, it would be found in the exquisite photographs which have been produced by it. One important advantage connected with the dry plate is its capacity for use. An idea of this may be gained from the fact that one of the conditions for the prize of £50 offered by Mr. James Paget for a dry plate process is that sensitive films made by it shall remain without perceptible change for not less than four months after preparation, and must keep satisfactory for three months in any climate between exposure and development. The advantage in results can be seen by the examples at the Exhibition, especially in regard to the faithful idea of interval and the exact delineation of objects at a distance. It would, however, be unfair to the older process, which has served its purpose so long and so well, unduly to praise the other at its expense, particularly in face of the very fine photographs it has produced, which are to be seen in profusion at the Exhibition. In addition to the pictures which are sent for competition, and which forms the exhibition proper, is a curious and interesting collection of photographs collected by Mr. L. Warnerke in the leading establishments of Sweden and Russia, and lent by him to the Council of the Society. These, in addition to illustrating phases of Russian and Swedish life, throw some light upon foreign processes of photography, and are well worthy of examination.—*Daily News.*

PHOTOGRAPHIC SOCIETY.—The annual *soirée* of this institution took place yesterday in the Gallery of the Society of Painters in Water Colours in Pall-mall. The guests were received by the President, Mr. James Glashier, F.R.S., and other members of the Council. The display of landscapes was admirable; but the portraits, as usual, fell short of the excellence of results attained by the photographers who have devoted themselves to scenery. There was an exception, however, in the three exquisite pictures by Mr. Hemery, representing the ages of innocence, wisdom, and of beauty. Of instantaneous effects there were some excellent sea pictures by Mr. Payne Jennings. The very large landscapes of Mr. Vernon Heath and of the Autotype Company maintain in every way the well-earned reputation which both have long enjoyed, and the views of St. Owen and the cathedral at Rouen are most illustrious specimens of the value of such architectural records. The applications of photography to ceramic ware by Mr. Watson, and the transparencies of the Sciopticon Company, deserve both notice and praise. The stereoscopic views of the Paris Exhibition by Messrs. Murray and Heath are perfection for such scenic effects. The contributions of the School of Military Engineering take no mean rank in the present collection, where they are brought into direct competition with the works of such eminent artists as Mr. Bedford and Mr. England. The landscapes, too, of Mr. Conway and Mr. Dunmore are particularly noticeable for their brightness and artistic character. The exhibition will remain open to the public until November 12, evening admission being also arranged on the Mondays and Saturdays.—*Standard.*

Photographic Society of Great Britain.—Last night the annual Exhibition of this Society was inaugurated by a *soirée* at the rooms of the Society of Painters in Water Colours, 5a, Pall-mall East, when the members and their friends assembled in such numbers as to make the inspection of the various works a matter of some difficulty. The Exhibition is, perhaps, not the best that has been held by the Photographic Society. It presents, however, notwithstanding the absence, as exhibitors, of two or three of the leading members, features of more than ordinary interest, inasmuch as some of those who have hitherto ranked as second- or third-rate artists have boldly come to the front, and taken a position that, gratifying as it may be to themselves, must at the same time tend to elevate the Society and the art which they practise. In the field of landscape British photographers have no rivals. They have made it their own, having outdistanced their Continental *confrères* just as our landscape painters have excelled, and, as a rule, triumphed over those of all foreign countries. There is, too, a noticeable advance this year in landscape photography, the dry-plate process telling with excellent effect on the artistic value of the work produced. Formerly, in transcribing the beauties of natural scenery, the success of photography was partial and varying. Sometimes a foreground would be the acme of perfection, daylight and truth meeting with a clear dawn, but distant objects, so completely amenable to the painter, would be slurred and blurred, or it might be the reverse—a clear distance and a blotchy foreground; but with the dry-plate work each part of the picture bears its due and proper relation in gradation and tint to the whole. This is an improvement which, like many other developments of this beautiful art, has been brought about by gradual steps. It is none the less marked, however, and in nearly the whole of the landscapes exhibited in Pall-mall, we may behold "the bright countenance of truth" depicted in studies of delightful freshness. Amongst the finest specimens are those by Mr. William Bedford, of 326, Camden-road; but, owing to the fact that his father was one of the jurors, they were not entered for competition. Mr. Payne Jennings, West Dulwich, is another contributor whose works are entitled to the highest praise. A frame of views in Ireland, by Mr. Jennings, are exquisite specimens of the art. Mr. Vernon Heath has been awarded a medal for a frame of four views in the Isle of Skye, the famous Scour-na-Gillian having as much attraction for the photographer as for the painter. In these views Nature's own cunning hand, assisted by the magic of the camera, is unmistakably present. Bits of rock, jagged, broken, shapeless, lying in chaotic confusion, backed up by a weird towering eminence, sublimely and magnificently grand, stand out with delightful, almost startling, reality, exciting the imagination and leading it perforce from nature to the contemplation of nature's God. This is the province of pure art, its highest aim; and in these views—snatches of Nature, in her most evanescent mood—Mr. Vernon Heath has exalted the art of which he is so accomplished an exponent. The sea studies, instantaneous effects, by Mr. Payne Jennings, are also worthy of the highest commendation—rather, however, for the beauty and naturalness of the clouds than for the restless motion of the waves. There are many views of the Paris Exhibition and its adjuncts by Mr. William England, St. James's-square, Notting-hill, and views in Kent and North Wales by Mr. Edward Dunmore. Amongst the portraits and figure subjects, although there are some excellent examples, there is no marked advance on previous exhibitions. It would almost seem that in this domain the art was at a standstill, and admitted of no improvements; but in these days of scientific discovery it would be unwise to hazard such an opinion, and on a matter of this kind we cannot venture to speak *ex cathedra*. In applying strong *chiaroscuro* to portraiture, Mr. R. Slingsby, of Lincoln, has already won his laurels. His two examples, *Satisfaction*, and the portrait of a lady, are deep in tint without heaviness, and the lights are soft and natural without abruptness. There is commendable delicacy in the work of Mr. T. G. Hemery, Peckham, and the perfection of monochromatic art in the opal enlargements by Messrs. R. Faulkner and Co., Baker-street, Portman-square. In portraiture pure and simple Mons. A. Boucher, King's-road, Brighton, and Messrs. Lombardi and Co., Brighton and Pall-mall East, hold a foremost place, their productions being essentially lifelike and graceful. Mr. A. W. Wilson, De Beauvoir-road, Kingsland, is the exhibitor of a frame containing illustrative photographs of *The Seven Ages of Man*, very excellent; and Mr. H. Garrett Cocking, High-road, Lee, son of the esteemed assistant secretary, sends four character studies, of which the most difficult, and at the same time most meritorious, is a scene from *The Husband in Clover*, the grouping of the two figures, as well as the general arrangement of the accessories, being cleverly managed. *Miss Rose Hersee*, as Elvira, *in the "Rose of Castile,"* is a work of merit; and, as regards *La Gitana*, it would clearly be unfair not to award the praise between the artist and the sitter. Mr. Harry Pointer, Brighton, contributes a number of instantaneous photographs from life, principally of domestic pets, in all kinds of peaceful and warlike attitudes, the whole forming an amusing collection. The Woodbury Company and the Autotype Company are, as usual, exhibitors of their enlargements, which are now so well known; and the School of Military Engineering, Woolwich, are large contributors of landscape scenery. Last year the views taken by the Arctic Expedition under Sir George Nares formed a special feature of the Exhibition. This year, also, there is a special feature, and one that is likely to be rather popular. Mr. L. Warnerke, Peckham-rye, a photographer of repute and an inventive genius, who has been honoured by foreign societies of a cognate character, has been to St. Petersburg, where he was instrumental in founding a photographic society. In his travels he also visited Sweden, and during his foreign sojournings he naturally made many friends. An evidence of this is afforded by a loan collection of photographs given to him by the leading establishments in Sweden and Russia, which are exhibited on the screens, and will well repay examination. They are chiefly Russian, illustrative of every phase of society there, from that of the palace of the Emperor to the cottage of the peasant. Mr. W. Carrick, an English miniature painter, settled in St. Petersburg, becomes an exhibitor, through Mr. Warnerke, of pictures of Russian life, embracing no fewer than 192 studies of character, and for these the Society has awarded him a medal. Mr. Carrick is also represented by a series of views taken in various parts of Russia. Several process are exhibited by Mr. G. Scamoni, head of the Photographic Department of the Imperial State Paper Manufactory, St. Petersburg, and by Mr. Sapteff, of the War Department. Coloured photography is not admissible to the Society's gallery, and, therefore, it happens that the new process called poikilographic painting, for reproducing oil paintings, invented and patented by Messrs. Lombardi and Co., is relegated to a rather bad light on the staircase. The five examples of this beautiful art are, with one exception, copies from the old masters, and the very texture of the originals is reproduced. The process is equally applicable to studies from the life. A negative is taken in the usual way, then enlarged on thin translucent paper or canvas, and the colours—mineral colours only being used—are applied on the reverse side, and show through the surface. The effect, which is very wonderful, is infinitely superior to anything produced by the oleographic or chromolithographic processes. As large works can be reproduced with the same fidelity as small ones, there can be little doubt that poikilography will play an important part in the dissemination of exact *facsimiles* of the great masterpieces of art.—*Morning Advertiser.*

Meetings of Societies.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The opening meeting of this Society for the winter session was held on Thursday, the 3rd inst.,—the Rev. F. F. Statham, M.A., President, in the chair.

Mr. E. Dunmore read a paper entitled *Varieties* [see page 485], which was followed by a brief conversation of a desultory character, in which Messrs. Foxlee, Pearsall, Bolas, and Ayres took part.

Mr. F. York then read a paper on *Photographic Experiences in Paris.* [See page 483.] Mr. York illustrated his paper by means of a number of pictures admirably exhibited by the magic lantern.

Votes of thanks having been awarded to Mr. Dunmore and Mr. York, the meeting was adjourned.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The ordinary monthly meetings of this Society were resumed on Wednesday evening, the 2nd inst., the chair being occupied by Dr. Thomson.

In consequence of the unavoidable absence of the Secretary the minutes of the previous meeting were not read, and the business commenced by the admission of the following as ordinary members:—Messrs. C. Morrison, D. Greig, — Bell, D. Wilson, J. Rodger, S. Garland, P. F. Patrick, E. Gilbert, William Rae, Thomas Rae, and Dr. Jamieson.

The only paper in the billet was one by Dr. Nicol, entitled *A Month among American Photographers.*

Dr. Nicol began by saying he regretted that the members had not something more practical with which to commence the session, and, although he disliked exceedingly to offer any apology in connection with a public appearance before the Society, he was compelled to do so on that occasion, as the request to prepare the paper had only reached him late on Saturday night, and he had found it impossible, in the limited time thus placed at his disposal, to do more than look over the notes taken during his recent tour in the United States and Canada. He laboured under another difficulty in the fact that the notes had already been pretty fully exhausted for publication in one of the photographic journals, and had doubtless been read by most of those present. He (Dr. Nicol) then gave a brief sketch of his visits to one or more of the photographers in the principal towns through which he had passed in a tour from Philadelphia to Flint, in Michigan, and exhibited a large collection of photographs collected by the way. Probably the most interesting were several beautiful panoramic pictures printed from various negatives by Mr. Gutekunst, of Philadelphia, and some exquisitely-beautiful specimens of portraiture by the same hand. There was also a large collection of the well-known art-studies by Mr. Sarony, of New York, which, both technically and artistically, were little short of perfection. He (Dr. Nicol) went on to say that the sum of the observations that he had made was that the American "skylights," as a rule, were really skylights, as side lights, on the whole, were little used; that the best results he had seen, including most of those he had shown, were produced without the aid of screens or blinds, the artist trusting almost altogether for the desired distribution of light and shade to the position of his sitter relatively to the top light, which he preferred to employ; and, further, that notwithstanding the much-envied brilliant atmosphere, and other circumstances supposed to be so favourable to the practice of photography in America, the photographers of England and Scotland had nothing to fear in a fair competition in the matter of portraiture at least, as if, probably, half-a-dozen of the best men were excepted the work in the United States was on the whole inferior to that generally met with at home. With regard to landscape work it was somewhat different, so far, at least, as the amateur was concerned. He was inclined to think that American amateurs stood higher than their European brethren. They were, probably, less numerous, but were more enthusiastic; and, in spite of the high pressure at which commerce generally was pursued, they had more leisure, and leisure of more photographic value, because of the greater prevalence of brilliantly-fine weather. He (Dr. Nicol) concluded by saying that everywhere he went he met with a most hearty reception, and found that American photographers generally showed a deep interest in the photographic sayings and doings of the old country.

The Chairman said that he was sure the members present had listened with much interest to the observations made by Dr. Nicol, and he would be glad to hear a general expression of opinion on any of the matters touched upon. The question of the relative proportion of side and top light was one of considerable difficulty, and one which every photographer must settle for himself. Generally speaking, a man would succeed best with that which he was best accustomed to employ, and very fine work might be done with either or both.

Mr. W. Neilson, in moving a vote of thanks to Dr. Nicol, said he did not altogether sympathise with the favourable opinion expressed regarding plain backgrounds in preference to pictorial or artistic embellishments. Both, he thought, were best, as, when a photographer had to photograph an interesting and beautiful subject, the sitter required no adventitious aid; but where the model was neither interesting nor good-looking it was better to make a picture of the background, bringing in the figure merely as an accessory.

Mr. M. G. Dobbie, while thanking Dr. Nicol for the interesting *résumé* of his tour, thought the Society should guard itself against endorsing the statement that American portraiture was inferior to that of this country. Dr. Nicol had only been able to visit a limited portion of the United States, and he knew there were many cities in which high-class work was done that he had not visited.

Dr. Nicol quite agreed with the observations of Mr. Dobbie, and of course wished it to be thoroughly understood that what he stated was simply his own opinion founded on what he had seen in the limited portion of the country he had visited.

On the motion of Mr. Dobbie a vote of thanks was given to the Chairman, and the meeting was adjourned.

Correspondence.

ON THE PRODUCTION OF OPAL PICTURES.

To the Editors.

Gentlemen,—As we have a good deal of opal work to do, and as our operators are at variance respecting the best method of producing pictures of that description upon which to work with pigments, kindly favour us with replies to the following queries, and which replies we believe will be of general utility to the profession.

Premising that we have hitherto got most of our opalotypes printed by the wet collodion process and by one who works for the profession, and being aware that he obtains his fine tones by some peculiar process of first rendering the picture invisible and then applying a developer, we should esteem it a favour if you would, first, throw out a hint as to the nature of the developer and general treatment consequent upon the adoption of such a developer; and, secondly, state whether in your estimation the developing of an opalotype by such means will conduce to its permanence, for as we obtain high prices for our work we strongly desire that it shall be both permanent and beautiful.—We are, yours, &c., A. & B.

October 8th, 1878.

[Similar queries to the foregoing having been epidemic during the past four months, and as we cannot afford time to reply *privately* to further communications on this subject, we have taken the liberty of publishing the above letter, instead of sending a private reply, as requested, having first of all taken the precaution of suppressing the name and address of our correspondents, and appending instead the initials now attached. Let it, then, be understood that in what we are now about to write we shall not indicate what is, in our estimation, the best method of producing opal pictures having a warm tone, but what is the best method based upon the routine described in the foregoing letter. There are two methods by which a picture upon an opal plate may be rendered invisible, so as to be ready for after-development. Presuming the picture to have been taken by the wet collodion process, developed by any suitable agent, and fixed by cyanide of potassium, and the image to be vigorous and plucky, with good detail, the tone is almost certain to be bad. The solution by which the picture was made to appear was one or other of the following: either a solution of bichromate of potash to which had been added a few drops of hydrochloric acid, or a solution of bichloride of mercury. Here we may state that if a strong solution of this latter salt be wanted it should be dissolved to saturation in hydrochloric acid, the solution being afterwards diluted with water. A little of either of the above solutions applied to a picture upon opal glass will very speedily render it invisible. This it does by converting the metallic image into a substance of a white colour, which, when backed by the white opal plate, is, of course, practically invisible. Should it have been bleached by the former of these solutions, causing the image to be converted into chloride of silver, there are, as Mr. M. Carey Lea has pointed out, several methods by which it may be darkened. Of these we have found an exceedingly weak solution of Schlippe's salt, with the addition of a little ammonia, produce the best tone. We have some reason to believe that the most popular process made use of by those who produce opaltypes under the circumstances mentioned by our correspondents is that of bleaching by means of the mercury salt described, having first added to it about an eighth of its volume of alcohol. When this solution is applied the image will at first darken, but will afterwards grow white until it has ceased to be visible upon the white plate. It must now be *thoroughly* washed, after which it should be flooded with a weak solution of sulphide of ammonium in water. The ordinary sulphide of commerce diluted with about six times its volume of water will prove a suitable degree of strength. Instead of this latter application a solution of hyposulphite of soda may be employed. It produces a somewhat blacker tone than the sulphide of ammonium. As regards the permanence of opalotypes produced in this manner we are unable to speak favourably. Probably the finest examples of photographs toned by this process which have ever been seen were those exhibited as illustrations of the photocrayon process, and which made no small noise in the world in 1869, when they were first introduced. Upon examining some of the specimens then produced we find that they have changed colour in a sensible degree. Mr. A. L. Henderson, who has bestowed some study on this subject, believes that if a solution of chloride of gold were mixed with that of the bichloride of mercury no change will take place. The method he suggests is to apply to the picture a two-grain solution of chloride of gold to which has been added one-fourth its volume of a saturated solution of bichloride of mercury in plain water. After the picture has been washed and dried it is to be fumed with ammonia, by which its tone will be darkened. Apart from the permanence of the method proposed, we imagine the tone will be rather colder than that which is so much desired.—Eds.]

CORRECTION.

To the Editors.

Gentlemen,—Kindly allow me to plead with your printer for the preservation of a little pleasantry in my paper on Switzerland. I remarked, *apropos* of an incident on the Gorner Grat, that the focussing slide fell over a precipice ten thousand feet above the nearest *glazier*. Your printer has, however, substituted the word "glacier," and thus makes me guilty of a misstatement, which would be very palpable to any one acquainted with the point of view in question.—I am, yours, &c.,

October 9, 1878. H. J. Palmer.

ENAMELS IN THE FRENCH EXHIBITION.

To the Editors.

Gentlemen,—Possibly some of your readers may be aware that Mr. J. R. Sawyer has, in the pages of certain monthly notes issued by his firm, enunciated his opinion that the enamels exhibited by English artists are "far behind" as compared with those shown by foreigners, and that this has been copied into the pages of your contemporary in the face of the fact that I have received a medal award for the excellence of those I sent. Without further comment I beg to request you to publish the following letter I have sent to the editor of the *Auto. Notes* in reply to his strictures.—I am, yours, &c.,

A. L. Henderson.

[Copy.]

To J. R. Sawyer, Esq., Autotype Company.

Dear Sir,—On my return from a continental tour my attention has been called to an extract from one of your letters "On Enamels at the Paris Exhibition," and published in the *Photo. News*. As I know you are neither a giant nor a dwarf I presume you did not go prepared to kneel before my enamels or to use a ladder to examine them. Such, however, is the position of my best work. Nevertheless will you be surprised to learn that I have been awarded a bronze medal? My enamels are all untouched photographs.

I will feel greatly obliged if you will communicate these facts to the party who reproduced your remarks.—I remain, Sir, yours respectfully,

A. L. Henderson.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Dark tent on wheels for 10 × 8 plates, can be used without wheels when required, having extra tripod, cistern, bottles fitted in place, cupboard to carriage, locks and keys, beautifully made, and photo. sent; will exchange for Dallmeyer's 4D, 2B patent, or 1A.—Address, W. Dakin, Holly Bank, Nether Edge, Sheffield.

ANSWERS TO CORRESPONDENTS.

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

Photographs Registered—

A. Brothers, Manchester.—*Figure Study entitled "Resignation."*

Edwards and Simonton, Dublin.—*Two Portraits of the Lord Bishop of Ossory, Ferns, and Leighlin.*

PHOTO-MECHANICAL CORRESPONDENCE.

☞ With reference to the series of articles on *Photomechanical Printing Methods*, by Mr. Thomas Bolas, F.C.S., the author will be happy to reply, in our "Answers to Correspondents" column, to such queries respecting the subject as may be forwarded to him through us.

R. V.—Its solubility may be increased by the addition of ammonium-chloride.

J. T. S.—The paper you refer to is largely employed by French lithographers under the name of "*Papier Vegetal*," and it is very well adapted for backing negatives, as it takes black lead very easily. You will probably be able to obtain it at the photographic stock houses, or at some of the lithographic material warehouses in London.

GENERAL CORRESPONDENCE.

R. F.—Received. Thanks.

W. Weaver (Runcorn).—Received.

A. J. Jarman.—We shall forward your letter to Mr. Willis.

J. B.—We regret to say that the gentleman about whom you inquire is dead.

R. Peers.—Your exchange is inadmissible in our exchange column; but it may be sent to the publisher as an advertisement.

Frederick Dougherty.—1. The oxycalcium burner, and a six feet bag.—2. Do not attempt to make the bags; you will obtain them cheaper and better ready made.

M. Shelley.—Build the studio of the full length required, the sitter to face the north. You will then have east and west light morning and evening, which you can use as required.

J. G. L.—Evaporate the bath to dryness, weigh the crystals, and use them as ordinary nitrate of silver, making a new bath with them. See that the strength be at least thirty-five grains to the ounce.

An Old Veteran (Whitehaven).—We should have liked to publish your letter, but we feel quite certain that the estimable firm so strongly eulogised would take serious umbrage were we to do so.

John E. Bliss (Cambridge).—This correspondent would feel obliged if any reader could inform him of the name of the photographer who took the portraits of the survivors of H.M. turret-ship *Captain*.

A. H. W. (Acton).—Try one of the following, viz., thin linen coated with wax or paraffine, thin paper, or ground glass. The last-named will undoubtedly answer your purpose best; but it would prove very expensive, owing to the large size required.

Rev. J. P. B.—Of the two lenses the half-plate portrait combination will prove the better objective for the lantern, provided that it is found necessary or expedient to have the screen at one end of the hall and the lantern at the other. But if, on the other hand, you decide upon placing the lantern in front of the audience—that is, between them and the screen—the quarter-plate lens will be the better of the two; but even it will be found to possess too long a focus. To meet such a case we suggest that you obtain a combination in which the back lens will be of two and a-quarter inches diameter, and possess a great amount of negative aberration, and that it be matched with a front lens of smaller diameter and short focus. Combinations of this kind are not kept in stock by opticians or dealers, but may be easily constructed to order.

David King.—The single-barrelled air-pump will answer quite well for withdrawing the moist air.

Paris.—So far as we can learn, the photographs of each nationality are exhibited in that nation's department; therefore, if you wish to examine (say) Italian photographs you must look in the Italian department, and so with the others, the photographs not being exhibited in one place.

E. S. D.—From an inspection of the picture we believe it to have been coloured by powder colours; but, after the colours have been applied, some particular kind of varnish must have been flowed over the surface in order to cause the pigments to adhere.

W. L. R.—1. Suitable orange-coloured material can be obtained at most upholsterers' establishments, under the name of "orange cambric."—2. You should consult any respectable dealer in india-rubber appliances.—3. Obtain an india-rubber stopper for the varnish bottle.

Cestrian.—The filtering-papers may be rendered quite free from the hyposulphite of soda by immersing them for some time in warm water. We strongly advise you to treat in this manner the whole of the package of filters; for by using them as they are you will inevitably experience much annoyance.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Offices, 2, York Street, Covent Garden, London, W.C.**

Photographers' Benevolent Association.—The Board of Management held their usual meeting on Wednesday, the 2nd inst., at 160*a*. Aldersgate-street. The minutes of the previous meeting were read and confirmed. The following gentlemen were duly elected as ordinary members of the Association:—Messrs. E. Tear, R. Prewett, and W. T. Wilkinson. An application for relief was then entertained, and, after full consideration, the Board granted the necessary order to meet the applicant's case. After other minor business had been dealt with the meeting was adjourned till November 6th, at eight p.m.

A Yellow Varnish for the Dark Room Window.—The *Photographisches Wochenblatt* gives the following formula for the preparation of a yellow varnish for this purpose:—Digest for several days in a wide-necked bottle, placed in some warm room, five parts by weight of Xanthorhöa resin (also called "acaroïd resin") in five parts by weight of ninety-five per cent. alcohol. During digestion the mixture should be shaken up from time to time. The sort of Xanthorhöa resin which goes by the name of "black boy gum," and which is dark in colour, is to be preferred. As soon as the alcohol has absorbed all the soluble parts of the resin add one quarter, by weight, of copal balsam or castor oil, in order to prevent the varnish from tearing. If requisite the quantity of the last ingredient may be slightly increased. When poured, like collodion, over the glass to be used for the window, the varnish dries rapidly, leaving behind it a perfectly clear, orange-coloured film which does not transmit a trace of actinic light, and which has also the advantage of adding but little to the cost of the clear glass. When the varnish is thinned with spirit it becomes lighter in the colour. This varnish is said not to lose its yellow colour owing to the action of light. It may also be used in the production of gold lacquer, as it may be used cold, and is glossy and transparent like ordinary gold lacquer. It has been used to brighten up old gilt frames.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For the Weeks ending October 9, 1878.

These Observations are Taken at 8.30 a.m.

Sep.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
26	29·96	88	62	43	46	49	N	Foggy
27	30·07	88	61	45	51	59	W	Fine
28	30·11	84	68	50	58	59	SW	Cloudy
30	29·68	98	65	54	56	59	W	Overcast
Oct.								
1	30·02	69	62	51	51	52	NE	Overcast
2	30·31	80	60	42	45	48	NE	Hazy
3	30·21	98	69	45	55	58	SW	Foggy
4	30·18	92	67	51	53	57	SW	Hazy
5	30·14	99	74	52	55	58	SW	Foggy
7	29·58	98	68	59	59	62	SW	Cloudy
8	29·38	98	69	57	58	60	SW	Cloudy
9	29·66	96	67	54	55	59	SW	Cloudy

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 963. Vol. XXV.—OCTOBER 18, 1878.

ON THE ARTISTIC QUALITIES OF NEGATIVES.

In taking up the thread of the subject we treated last week, we must warn our readers that it is beyond our power to point out a "royal road" to success in the production of artistic results. The technical departments of photography may, no doubt, be fully laid down upon paper in such a manner that any ordinarily-careful person may understand and master the details with comparatively little practice; but when we venture within the bounds of art the pen becomes a feeble exponent of the laws and requirements. It is a simple matter to give directions as to the mixing and blending of colours so as to produce certain secondary effects; but not all the volumes that were ever written would be sufficient to supply the power of uniting those colours into a faithful transcript of nature. So we propose to speak chiefly of the chemical and mechanical conditions of photography, and to point out in what respects they may be varied in order to aid as far as possible artistic requirements.

Perhaps, strictly speaking, exposure and development belong rather to the technical side of the question than to the artistic; for a negative must be photographically perfect before it can aspire to pictorial excellence, and this involves not only a due amount of care in exposure but an equally careful and suitable development. Still we may be permitted to refer to one or two points connected with these two operations, which bear, perhaps, as much upon the artistic as upon the technical quality of the result.

To a certain extent it may be said that the requirements of artistic and technical excellence do not necessarily run together. An artist's rendering of a given subject would be widely different from that of a mere mechanical draughtsman; and, though the respective productions might be, for their special purposes, perfect, each would present certain characteristics wholly at variance with the requirements of the other. So, in the production of certain pictorial effects photographically, it is occasionally necessary to depart from the strict rules applying to purely photographic results, as in the case of so-called "moonlight views," which, judged from a technical standard, are merely under-exposed pictures; but in adopting such a course as this it is needless to say that the departure from orthodox rules must be made with a full knowledge of the exact effect it is desired to produce, and not in a haphazard way, trusting to good fortune to bring about a satisfactory result.

It is a question whether such "tricks" can be legitimately considered artistic; but, on the principle that *ars est celare artem*, the artifice is, no doubt, justifiable so long as the result does not expose the fraud.

The chief difficulty in the matter of exposure consists, as we have pointed out, in securing harmony between the unequally-illuminated portions of the subject; and while this difficulty varies in degree with different processes, it is never, even under the most favourable circumstances, wholly absent. With certain classes of subjects—those presenting but little natural contrast—it may, perhaps, be ignored; but it must be remembered that subjects of this description very rarely afford material for pictorial results, and therefore the gain in the technical department is neutralised by the absence of those artistic qualities which it might otherwise supplement.

The difficulty we speak of is more or less natural to all processes, wet or dry, and arises from the incapacity of a uniformly-sensitive film to render, under identical exposure and development, the different degrees of actinic action produced by the rays transmitted from the various grades of the subject. The charm of a landscape depends upon its "atmosphere;" but, in the great majority of cases, if a sufficient exposure be given to secure a proper rendering of the foreground, objects at a greater distance will be overdone. The only obvious plan of combating the evil is to regulate either the development or the exposure to suit the varied degrees of illumination in the several portions of the picture. The first is practically impossible, but, by dint of a little care and judgment, considerable benefit is derivable from the use of masks or screens to shade the better-lighted portions of the image during a part of the exposure. Numerous contrivances have been described, under the name of "sky shades," by which the purpose may be effected; but, though there is no controverting the fact of their utility when applied with skill and judgment, there is a tendency to abuse the power thus acquired.

We have seen many landscapes by various operators in the production of which the sky shade has been utilised in order to modify the over-action of distant objects, and we have no hesitation in saying that in the greater number of them the power has been abused—the masking has, in fact, been pushed to such a degree that foreground and distance have received proportionately the same exposure, with the result that atmospheric effect is entirely annihilated, distant objects being as sharply and vigorously rendered as those in the immediate foreground. The only excuse that can be offered for this fault lies in the fact that a negative with a clear, sharp, *under-exposed* distance *looks* nice; and, difficult though it may be to eradicate the habit, we must repeat what we have already said in our previous article in reprobation of the practice of judging negatives by their appearance rather than by their printing value.

The development, we have said, affords no opportunity of locally modifying its action; but a great deal may be done in the production of different effects by varying the character of the development, with or without altering the exposure. But in drawing upon the capabilities of a modified development it is very necessary to distinguish between the effect required in a case of simple over- or under-exposure and one in which the aim is to secure harmony between the contrasting portions of the picture. The conditions presented are almost diametrically opposite, and, of course, necessitate very different treatment. Suppose, for instance, we have a plate which we know to have been much over-exposed. It would be proper in this case to apply a powerfully-restrained developing solution which would bring out the image slowly and place it more under control. But in addition to, and of more importance than this, the greatest action of the restraining agent is exercised upon the most feebly-impressed portions of the image; and thus, by holding the shadows in check, a degree of vigour and contrast is imparted to the picture which would not otherwise be obtained.

But when the object is to secure harmony we have, so to speak, to deal with both under- and over-exposure; for, viewed relatively, the foreground is under-exposed while the distance is overdone, and the task before us is to effect a compromise between the two. Applying the same argument with regard to the employment of a well-restrained developer: if it contain a sufficient proportion of the restraining agent to prove effective in checking the over-action in the distance the already existing deficiency in the foreground will be still further exaggerated; and, though the detail may not be totally obliterated, it will be so enfeebled that the treatment necessary to bring it to printing density will utterly ruin the distance.

The more correct course to adopt under these circumstances is to use a developer in which the restraining agent is reduced to the lowest possible proportion. Presuming the alkaline method to be in question, we should employ a weak solution of pyro. (not more than one grain to the ounce) with the faintest trace of alkali and *no* bromide, applying it to the film until a thin, flat image, showing every detail, becomes visible, then intensify carefully. There need be little fear (if the exposure has been well timed) of want of contrast, for the lights during intensification will be found to gain strength with much greater rapidity than the weaker portions; the only danger will arise from a too rapid or hasty intensification. Some operators prefer to commence the development with plain pyro.; and though this may answer with an evenly-illuminated subject, such will not be the case under the circumstances we speak of. The fact is that plain pyro., though effective enough with a full exposure, is little adapted to the production of faintly-impressed detail; and upon the addition of alkali in however small quantity, in order to bring out the detail, the image already developed commences to intensify, and goes on gaining density with much greater rapidity than if the alkali had been used from the first. In this manner the contrast is increased rather than diminished, while the harmony sought for is not found.

Another element which materially affects the general character of the result is the process employed. Now, though we fully agree with those who believe that *any* process is capable of producing first-class results provided it is carefully studied and mastered, there is no gainsaying the fact that certain processes give a larger proportion of results of high quality than others, from which it may be inferred that the former present fewer natural difficulties to be overcome—that, in fact, with a given amount of trouble they produce a better result. Up to a very few years ago it was the almost universal opinion that dry processes in general were far inferior in this respect to wet; indeed, we have frequently heard enthusiastic dry-plate men assert their belief that their films were, even under the most favourable conditions, incapable of equalling the best wet work. Now this is all changed, and there are those at the present day who assert that to produce the very highest class of results a dry process is necessary. Whence arises this change?

It certainly is not to attributed solely to our increased knowledge of dry-plate requirements, though that may account for some part of the improvement; for there were, ten years ago, dry-plate workers who were quite as far advanced in their acquaintance with these particular processes as we now are with more modern processes. The change evidentally comes from some alteration in the dry processes themselves, and that alteration we firmly believe to be simply the vastly greater degree of sensitiveness which is now attained. Mr. Charles Bennett has pointed out how this property operates in favour of a better quality of picture by rendering extremely feeble detail, which a slower plate, even with a relatively longer exposure, would fail to produce; and this forms the chief, if not only, argument in favour of rapid films for ordinary work. But, as we have attempted to show in previous articles, there is a counterbalancing disadvantage in the employment of these films in the increased amount of care necessary. The production of really high-class results of course involves a greater amount of care and patience under any circumstances, and in the matter of sensitiveness it will therefore remain for the operator to form his own judgment as to how far it is necessary to go in order to obtain films of the requisite quality.

Care, indeed, forms the keynote to success in this branch of photography, as in any other departure from the ordinary run of respectable mediocrity; and if, in addition to the extra amount of care, each operator would also devote some little attention to the intelligent study of the technical portions of his work in the directions we have indicated there would soon be an improvement in the character of his productions.

THE PHOTOGRAPHIC EXHIBITION.

[Second Notice.]

Resuming our description of what is displayed on the table: Mr. J. Lane exhibits a camera and other apparatus. One noteworthy feature in the camera is that it opens out to nineteen inches; but by means of a supplementary base-board the body can be extended five and a-half inches beyond this measurement, or twenty-four and a-half inches in all. As a landscape camera it is adapted for whole plates, and it possesses the means of allowing the back (which is a reversing one) to be taken out, and a repeating-back to be inserted. Both of these adjuncts are to be seen on the table beside the camera, which is also fitted with a vertical and horizontal swing adjustment. Mr. Lane's ingenious top for his camera-stand—in which adjustments can be made with great accuracy—will approve itself to everyone on account of the facility with which it can be brought to an accurate level.

Mr. John Harmer exhibits a series of twelve stereoscopic transparencies (332) executed quite *à la* Breese. The effects of moonlight are wonderful. These pictures excite much comment from connoisseurs.

Ceramic photographs are exhibited by Mr. W. Watson and Mr. Henry N. White. The latter show the application of this branch of photography to tiles, the former to cups and oval *plaques*.

The Woodbury Company exhibit many beautiful transparencies, perfect in gradation and charming in tone. These are also characteristic of a large collection of transparencies exhibited by the Sciopticon Company, which, being of smaller dimensions than the others to which we have just made reference, are capable of being displayed by means of the magic lantern. Of the quality of Mr. England's transparencies we have spoken so frequently before that we need only say that those in the present Exhibition are quite equal to the best of his productions seen by us previously.

A frame of cloud negatives is exhibited by Mr. W. Perry, to whom, we imagine, many photographers are not a little indebted for the skies of their landscapes.

Mr. Henry Whitfield exhibits several gelatino-bromide negatives of views in Devon and Somerset, and Mr. J. H. Ritchie demonstrates the keeping properties of plates prepared by the tannin process by exhibiting one which was thirteen years old when exposed.

A Winter Night (347), by Mr. Charles Bennett, represents a transparency from a gelatino-bromide negative taken at *night*, last February, by the ordinary illumination employed in villa residences in the country. Of this picture we have already given full details in this Journal.

These complete the exhibits on the table.

The eye rests with delight upon the sunny, atmospheric landscapes of Mr. Vernon Heath, whose *Vale of Festiniog* (10) may be cited as an example of high-class work, possessing fine gradations of distance. It is to the frame of four views in the Isle of Skye (11) for which the medal was awarded, and the pictures in this frame amply repay close study. Mr. Heath also contributes several autotype enlargements of great merit.

Messrs. A. and J. Bool's large direct picture, *An Old Farmstead* (9), shows that the difficulties of producing direct large works have been ably overcome by these artists. Mr. E. Brightman's picture, *A Devonshire Lane* (16), is an excellent example of that gentleman's work. The enlargement of *Ferns and Bluebells* (26), by Messrs. Marsh Brothers, is a highly-successful piece of work.

A pair of companion pictures, respectively *The Oak* (32) and *The Farm* (33), by Mr. J. Dudley Radcliffe, are good subjects nicely treated.

Eight views done in the inimitable style of Mr. William Bedford occupy a prominent position on the walls, and emphasise the presence of this master of landscape. Mr. Bedford's pictures are entered as "not for competition." His two views at Bettws-y-Coed are among the finest work that we have ever seen produced, even by Mr. Bedford himself.

Mr. T. G. Hemery contributes three portraits (40·1-2) on opal glass. The centre figure, an elderly man with a flowing beard, is very fine.

We have, whether rightly or wrongly, always been in the habit of associating Mr. Henry Cooper with the production of what we may designate "lane scenery"—that is, little artistic "bits" picked up during a ramble through rural scenery. In the reproduction of such views we know Mr. Cooper to be *facile princeps*. We do not find in his exhibits this year any examples of precisely this class of picture, but we find, instead, some scenery of another character selected with the æsthetic taste and executed with the ability of a skilled artist. These will be found on referring to Nos. 52-8.

Ruddier in tone, while equally faultless as regards their pictorial and technical treatment, are a series of landscapes by Mr. H. B. Berkeley, who, by the exhibition of such graphic works, shows the futility of an observation we once heard made by Sir David Brewster, to the effect that the faculty for scientific research was very seldom found associated in one individual with manipulative and artistic ability. Every reader of this Journal knows well how high Mr. Berkeley stands in the former category; the five frames of pictures (86 *et seq.*) prove the possession of the latter quality.

Several excellent pictures of river scenery are exhibited by Mr. H. A. H. Daniel—his *Mill Dam* (69) being a good example of his work.

What would a photographic exhibition be without the wonderful and charming examples of babyhood by Mr. R. Faulkner? His enlargements, on opal glass, of picture of this class are exquisite. Of the six opalotypes (75, &c.) we are unable to express a preference for any one specimen. *Held in Bondage* is, simply, perfection. Here a little girl clasps her kitten closely in her arms, both subjects being replete with life and character. The study of such works must be productive of good to photographers. In addition to these Mr. Faulkner has a frame (307) containing upwards of fifty small views of the same class. This able artist has aimed a blow at conventionalism by his adoption of a red tone in these prints, which are produced in permanent pigments.

STOPPING-OUT BACKGROUNDS.

Although the time has long gone by when a perfectly-stopped-out sky, printing clean and white, was considered a point of great importance in a landscape negative, there yet are many occasions when, for various purposes, the production of a white ground is a matter of importance, if not, indeed, of necessity.

Thus, in our last week's issue, we treated of the desirableness, from the manufacturer's point of view, of having objects, such as machinery, &c., represented without any of the usual surroundings or adjuncts of the workshop. Those only who have tried work of this kind are fully aware of the difficulty of the process; and for a restricted class of work a few hints upon the subject will not be out of season, our readers fully bearing in mind that our remarks are only intended to have a limited application, though we think it unlikely that anyone nowadays would endeavour to send out a white-skied landscape.

It is possible to attain the object in view by two methods—first, by the painting out upon the varnish of everything but the required subject or subjects; and, second, by cutting an opaque mask and placing it *in situ*.

Taking the first method under consideration: we may say that a most important matter is the obtaining of a suitable paint for the purpose. We often see recommended, as apparently on an even footing, Indian ink, gamboge, lampblack, black varnish, and almost every pigment of the artist's palette has in turn been suggested. For a small spot, or when the details to be obscured are of themselves not very thin, there will not be much difficulty; but when a case arises where the background to be obscured consists of every variety of depth—portions, perhaps, being clear glass—it will be found that very few materials will answer every requirement.

Take as the most readily obtainable and nearest to hand the cake or moist water colour. The latter in the body required for complete opacity to actinic rays will not dry sufficiently upon the glass, and is in consequence quite useless. The former—the cake colours—have usually so much gum in their composition that after a little while they crack, and, perhaps, bring a piece of the film away.

Gamboge is a useful material in some instances, but has not "body" to cover well when complete opacity is required. We have seen many negatives on which it has been tried, and frequently it had to be supplemented by another coat on the outside, *i.e.*, the glass side, of the negative. Next comes indian ink—a most useful material, but still very difficult to cover well unless special precaution be taken. The time and labour required to grind even a little down into paint is no small matter. If this material be chosen it must be used very thick—as thick as cream—or the work will have to be done over again, owing to a number of semi-transparent spots making their appearance when dry. Then, again, this remarkable pigment is of such a peculiar nature that, when it has been rubbed down and allowed to dry, it will not, when re-moistened and taken up into the brush, work like that newly prepared; it loses its covering power, and will not flow with anything like the same facility from the brush. And, finally, we have seen more negatives than one the films of which have cracked under the use of indian ink.

The best water-colour material we ever saw was, without exception, an experimental tube of moist colour which, by special request, the manufacturer had made without any extraneous substance beyond the pigment itself and the water it was ground in. The intention was that a variety of substances should be tried to discover the best medium which would bind the paint but not crack the film. Lampblack was the colour chosen; it covered splendidly, but of itself naturally has no cohesive power, and might almost be blown off the surface painted with it. Various binding materials were tried—gelatine, gum, albumen, &c., with a little glycerine, treacle, honey, sugar, &c.; but the gentleman by whom the experiments were made finally gave it up as involving too much trouble to "mess" with. At the time we speak of he had a very large number of machinery negatives in hand, and was almost at his wits' end to get them done well and *expeditiously*. Circular saws, he said, when every tooth had to be painted out from a most variegated background, were, beyond measure, troublesome.

We have placed last on our list the best. For all general purposes a good "black varnish," in our opinion, is preferable to anything we have named, provided only that the negative will not be required again in its pristine state. It is obvious, of course, that many cases will arise where the permanent blocking out of part of a negative is entirely out of the question; for, though it is possible to remove a coating of thin material unless it has hardened by being allowed to remain a long time before treatment, it is practically one of those operations which had better be left undone. When the use of the black varnish is contra-indicated we advise the employment of indian ink, carefully laid on, not too thick, with a little stippling in weak places when dry, and aided by a loose mask on the glass side of the negative, which will reduce the space necessary to be painted upon to the smallest area.

The black varnish to be used is not the "Brunswick black" or the "Japan black" of the shops, but one of the kind made for the use of the "ambrotypist"—the "positive" black varnish; indeed, we have scarcely met with a sample made for the use of photographers which did not answer well. The best for the purpose is that made with a benzole or naphtha solvent; it seems to have incorporated with it a pigment, in addition to the asphalte, which gives to it a surprising body or covering power. The first two we named do not possess sufficient body, and the latter of them is too long in drying. We will defer the treatment of the use of movable opaque masks till next week.

RECENT PATENTS.*

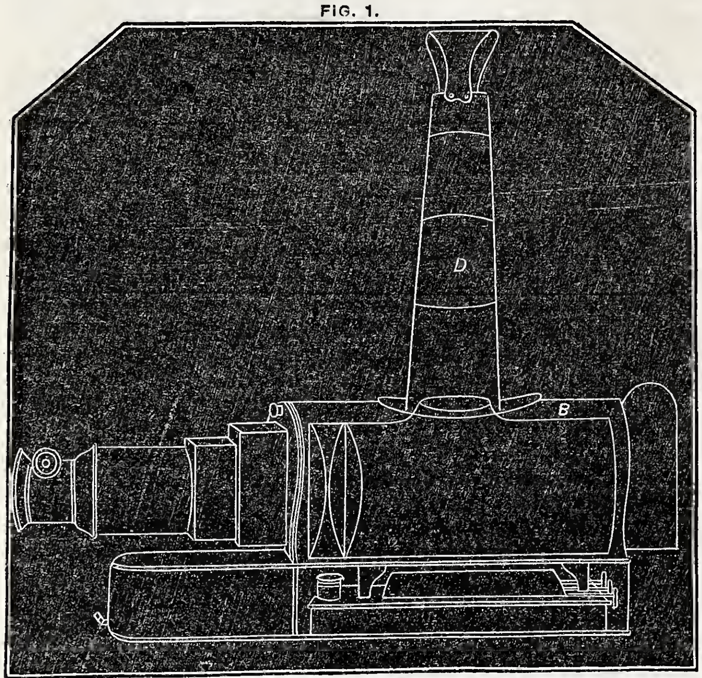
No. XVI.—HUGHES'S TRIPLEXICON.

Description of the Drawings (with Further Description of Details for Carrying my Invention into Practical Effect).—*Fig.* 1 shows

* Concluded from page 470.

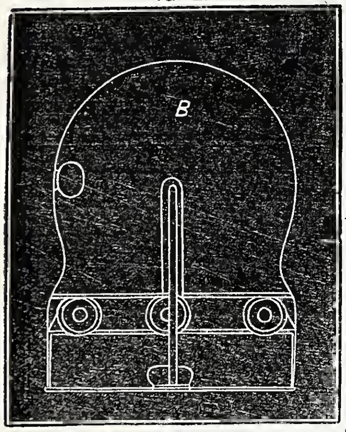
the form of the lantern body in elevation, same measuring (for three

FIG. 1.



and a-half or four-inch condensers) twelve and a-half inches from front to back, eight and a-quarter inches in height, and nine inches wide, and made larger if necessary, according to the size of the lantern condensers used. *Fig.* 2 is a back view of the lantern, showing exactly the form it assumes. *Figs.* 3 and 4 show the lamp in its entirety, and *figs.* 5 to 19 various sections of the same.

FIG. 2.



The lamp proper consists of an ordinary cistern or reservoir (B, *fig.* 3), which can be made any size to contain sufficient oil for the time the lamp is wanted to burn; on the top of this are wick tubes, three in number, through which the wicks pass, and are raised and depressed by three separate racks and pinions with milled heads. The centre wick holder is quite perpendicular, while the two side ones lean towards the centre one at the top (as shown by B, C, D, in

FIG. 3. FIG. 4.

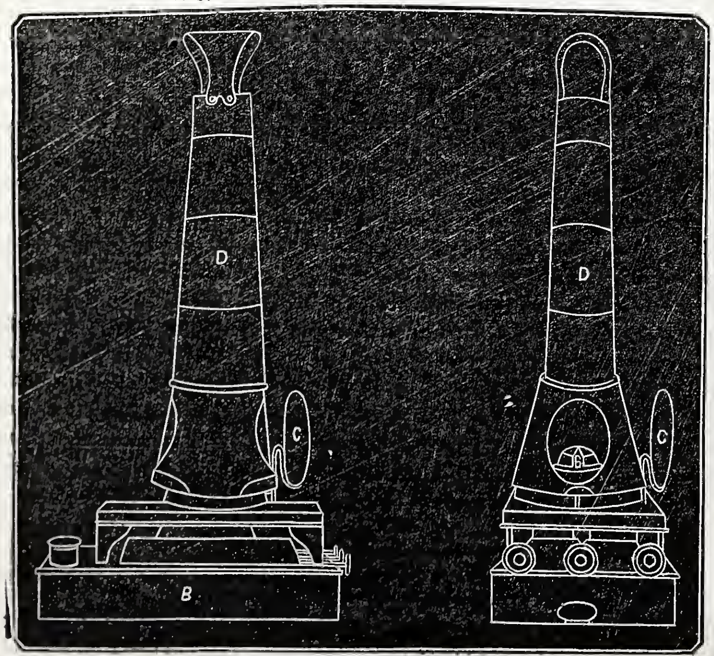
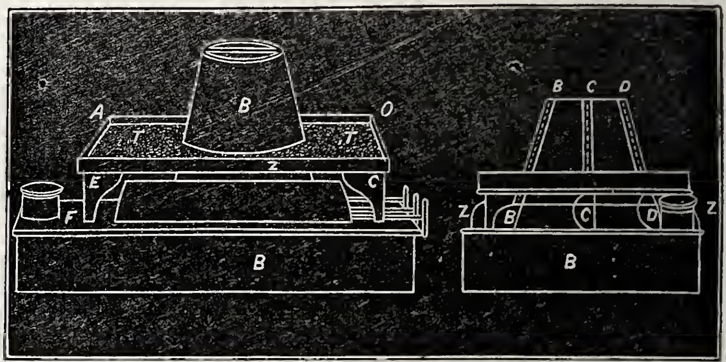


fig. 6), so that the three wicks may be enabled to assume the several shapes shown in *figs.* 10, 11, and 12. The two outside wicks in either case are more widely separated at some points than others from the centre wick (as shown at B, C, D, *fig.* 6), while at one point they are brought closer together, and are not wider apart in any position than half an inch and one-sixteenth, and not nearer together than a bare quarter of an inch in the narrowest part of the various curves, as shown in *figs.* 10, 11, and 12. There must be also between each wick holder (soldered near the bottom) perforated plates, as shown at A, B, C, *figs.* 10, 11, and 12. This is to prevent the air from rushing through too violently, and only to allow the proper quantity of air to pass between the flames for the proper combustion. The wick-holder is generally two inches and three-quarters in height. On account of the capillary attraction they should not be less, as sufficient amount of space must be allowed for the air to pass through in order to feed the flames.

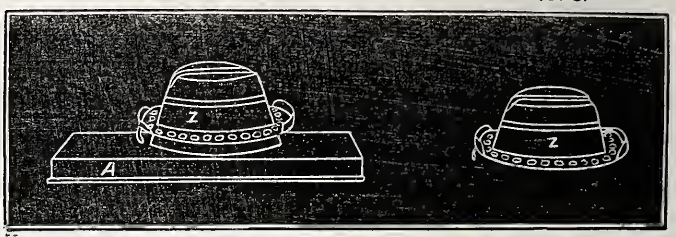
FIG. 5. FIG. 6.



Above the ground plate (F, *fig.* 5), and resting on four separate feet (A, E, C, O) barely one inch in height, is another plate (T) which is perforated with a number of small holes. This plate is about six and a-quarter inches long by four and a-quarter inches wide, having entirely around it a ledge *z*, three-eighths of an inch in depth. When the cover plate (*fig.* 7) is placed thereon the air penetrates through the cone *z*, and thence to the flames.

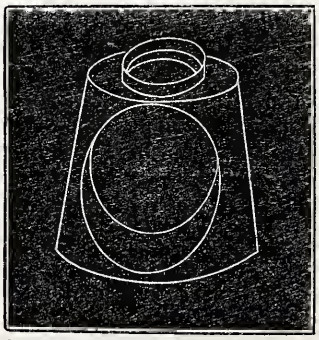
Between the perforated plate or platform, and on the top of cistern of the lamp, is placed a metal shield (see *fig.* 5) to prevent the heat from being thrown down direct upon the cistern containing oil. This is situated at both ends of the lamp, and is arched like a bridge (see *z*, *z*, *fig.* 6). On the cover plate (*fig.* 7) is fixed a bell-shaped

FIG. 7. FIG. 8.



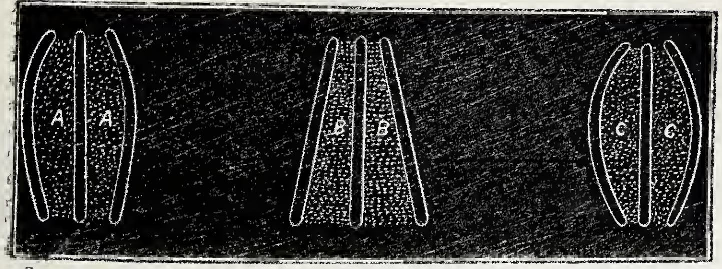
cone *z*, standing two inches in height, and in diameter at the bottom three inches and three-quarters. The extreme edge of same is turned back to allow of firmly soldering it to the ground plate of the cover underneath, the top part of the cone covering the wicks being two inches and three-quarters in diameter, down the centre of which a slot (B, *fig.* 13) is cut, of the size and shape to lie right above the curves of the two side wicks in either of the three positions before mentioned, and is raised above the two side wicks half-an-inch. The slot is carried in depth on the cone at either end half-an-inch (as at B, *fig.* 4). Between the cone and the wicks there is sufficient space to allow the air to efficiently do its work on any portion of the flames. It is, therefore, these dimensions and sizes of the various parts and fittings, together with the combustion chambers, that regulate this sized lamp suitable for magic lanterns with three and a-half or four-inch condensers.

FIG. 9.



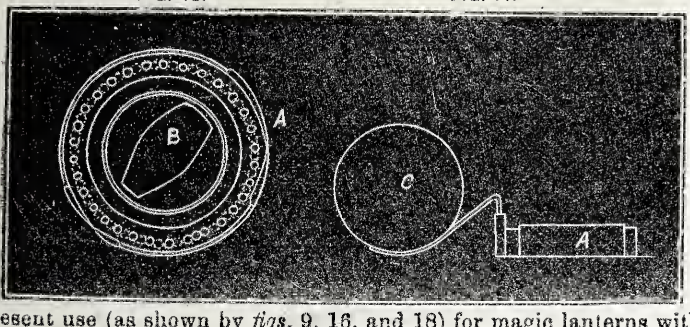
This lamp can be used for burning paraffine oils, but should colza oil require to be burned in it I can adapt an ordinary fountain cistern, but a little variation in sizes, either larger or smaller, will not prevent the desired and proper combustion of the flames; but to whiten the flames a proportionate quantity of fine wire gauze or muslin can be placed between the perforated plate (T, *fig.* 5) and the top plate (*fig.* 7).

FIG. 10. FIG. 11. FIG. 12.



The combustion chamber, as before mentioned, can be made of various shapes, but not larger in proportion than adopted by me for

FIG. 13. FIG. 14.



present use (as shown by *figs.* 9, 16, and 18) for magic lanterns with three and a-half or four-inch condensers.

FIG. 15. FIG. 16.

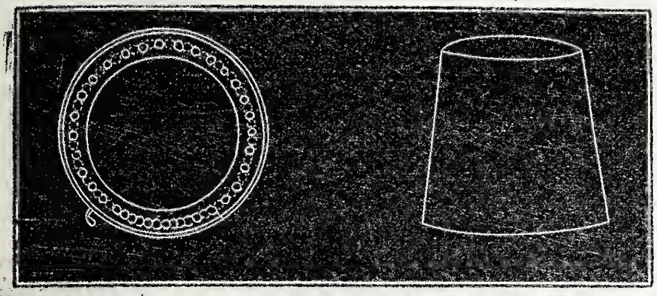


Fig. 16 is the glass chamber or cylinder (which must be made of blown annealed glass), about four inches in diameter at the bottom, three inches and one-eighth at the top, and three inches and three-quarters deep; the metal frame or cap (*fig.* 9) being just the size to cover the glass cylinder or chamber loosely, having openings back and front to let the light out. This, when the metal chimney (A, B, C, *fig.* 3) is attached, forms a complete combustion chamber.

Fig. 13 is the ground plate, which is circular and raised about midway up the bell-shaped cone (*z*, *fig.* 7), covering the flames, and securely fastened to the same, in order to hold the combustion chamber firmly. This ground plate is made in two separate pieces (as in *figs.* 13 and 15), but forming, when together, one platform. The top plate (*fig.* 13) has its inner and outer edges turned over on the underneath portion to form a frame, in which is placed the bottom plate (*fig.* 15), fitted moderately loose to allow it to revolve round either one way or the other. Both of these plates have a number of holes (say twenty-seven, for instance) at certain distances apart, and about one-eighth of an inch in diameter, the same being punched through the plates for the purpose of forming a vent for letting in the outside air to the combustion chamber should the glass chamber fit too tightly in the metal frames. By this arrangement the bottom piece is turned, and so covers and uncovers the holes situated on the top ground plate (the dotted lines in *figs.* 13 and 15 showing the position of the same). Attached to the perforated ground plate are two ledges, placed in such a position as to be back and front of the lamp (see A A, *fig.* 13, which shows their position). These ledges are placed for the purpose of retaining the combustion chamber firmly and securely in its place. D, *fig.* 3, is the connective metal chimney which forms part of the combustion chamber. C, *fig.* 14, is the reflector, which moves to and fro in a slide A, and is placed on the right side of the ground plate (*fig.* 7) covering the wicks. This is to enable the operator to adjust it in a proper position.

Fig. 18 is a metal cap or frame which rests on the glass chamber without resting on the ground plate, to which is attached the outside metal chimney, made in size according to the glass chamber.

Fig. 17 is an ordinary glass chimney, which can be used on the ground plate (*fig.* 13) if desired.

FIG. 17. FIG. 18. FIG. 19.

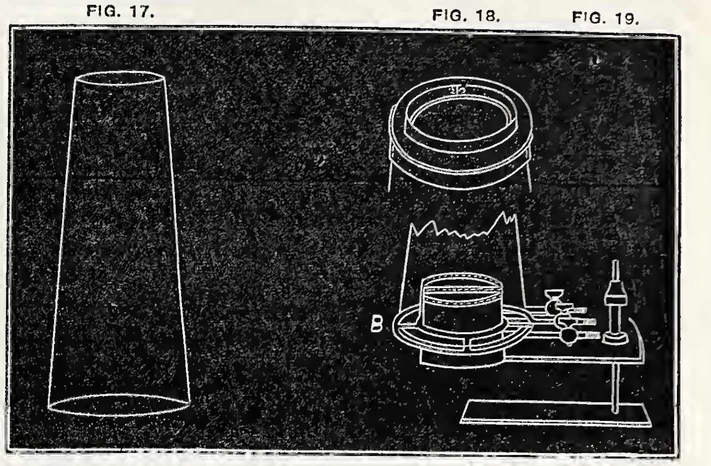


Fig. 19 is a gas burner having the same curves as the orifices in *figs.* 10, 11, and 12, but instead of pinions having three separate gas taps for adjusting the flames to a nicety; the width of the burners will vary in size from half-an-inch to eight or ten inches. They will also curve similarly to the wick tubes as used in the oil lamp. The cone *fig.* 8 will fit over them, and a metal platform (B, *fig.* 19) near the bottom will hold the cone and glass chimney or combustion chamber. This triple burner will assume the same positions, &c., as in the other portion of my invention relating to the "triplexicon" lamp.

The "triplexicon" lamp in its completeness can be made larger, the dimensions being of course in proportion with the size of the wicks, any part accordingly being made on a proportionate scale, which will ensure proper combustion.

Having now particularly described and ascertained the nature and object of the said invention, and in what manner the same is to be performed or carried out in practice, I hereby declare that I claim—

The new or improved form of lamp hereinbefore described, having three distinct wicks and separate racks and pinions, or equivalents therefor, arranged substantially in the manner hereinbefore set forth and described with the view to ensure proper and perfect combustion, whether for magic lanterns, streets, ships, halls, light-houses, &c.

Also the arrangement of the ground plate and of the combustion chambers, substantially as the same are hereinbefore set forth and described.

W. C. HUGHES.

We have only to add to the foregoing a remark to the effect that so intense is the light of the triplexicon in its present improved form that we have seen it successfully applied to the exhibition of objects by polarised light, as well as to the delineation of the larger microscopic objects hitherto shown by means of the oxyhydrogen microscope.

It is rather late in the day to speak of the necessity of cleanliness in photographic operations, and somewhat supererogatory on our part to impress upon our readers the desirability of keeping the various baths, dishes, and other utensils each to its special use as possible. This may not be convenient at all times; but when any departure is made from the rule it is needless to say that a thorough cleansing of the bath, dish, or bottle, as the case may be, should take place before applying it to its new use. We do not refer to a mere washing until the vessel *looks* clean. It should be *chemically* clean; and, when circumstances require it, strong measures should be resorted to. The utmost precaution, however, sometimes fails, as the case we are about to mention will show. We had submitted to us a few days ago a number of prints which were covered with a network of peculiar reticulated markings, which gave them the appearance of having been fitted together from a number of irregular pieces, after the manner of a child's "puzzle." The following information was vouchsafed as to the cause of the markings:—The prints, which passed successfully through the various operations of toning and fixing, were washed in two or three changes of water and left over-night in a porcelain dish to soak. The dish (an old one) had some time previously been used for sensitising paper, and when discarded for that purpose had absorbed, as porcelain will do, a considerable quantity of silver, which the cracks in the enamel plainly showed. Before applying it to a new purpose it was thoroughly scoured with fine sand, and then left for several weeks to the action of dilute nitric acid. This treatment had apparently removed all the silver, and after another thorough washing the first use it was put to was the soaking of the prints we mention, and the result showed too plainly how inadequate had been the cleansing. Porcelain is an abomination when silver solutions are used, and we should be glad to see it banished from the photographic laboratory if possible; but, so long as dishes of that material continue to be used, we would have our readers beware of the danger which is likely to arise from the indiscriminate use of one dish for different solutions. In the case we mention the effect was remarkable, and consisted of a faithful reproduction on the prints of every minute crack in the enamelled surface of the dish; and this not only on the print in immediate juxtaposition to the cracked surface, but through several as they lay one above the other in the water. In the whites of the print the markings were brown, and resembled ordinary hypo. stains; but where the image existed the tone was changed from a warm purple to a cold, slaty blue without any appearance of sulphurisation on the albumen side, though on the back of the print the lines were brown, as in the other portions.

SUBSTRATA AND BACKING.

There is, probably, no photographic process that has during any given time received more successful attention than that of collodio-bromide emulsions. Allowed to lie dormant for years after its first suggestion, the process was at length taken up with enthusiasm and prosecuted with such energy by most of our ablest experimentalists that one by one its difficulties were removed and its conditions understood, till at the present time, whether as regards simplicity of manipulation, certainty, or beauty of results, it is as nearly as may be perfect.

While, however, this is true as regards the nature and properties of the various more or less well-known varieties of the emulsion family, there are certain minor troubles with which the emulsion worker has to contend that have not received so much attention, and which ever and anon crop up to mar the otherwise even tenor of his way. Not the least troublesome of these is the difficulty in preventing the film made from certain samples of pyroxyline from slipping from the plate. Much has been written about the necessity for a suitable sample of pyroxyline for emulsion work, and I am aware that there is a general impression that the variety made with rather weak acids at a high temperature is most suitable for the purpose; but I think there is, in the results both of my own experiments and the practice of many of my friends, ample evidence that this is a mistake; that an excellent emulsion may be made from any good sample of pyroxyline; and that the variety best adapted for wet collodion is possibly also the most suitable for emulsion work. But there is one objection to such cotton which makes its use a source of vexation, namely, its tendency to slip from the plate, especially during the washing after fixing, which renders some kind of substratum, or other means of curing the evil, a necessity.

For this purpose the use of albumen has become very general, and no doubt it possesses many advantages; but for emulsion work it has the grave defect of, in too many cases, not answering the intended purpose. It is cheap, very easily applied, and secures a chemically-clean surface; but while, with all samples of collodion for the wet process, it holds the film perfectly, my experience leads me to say that most of the emulsions I have tried, whether made by myself or by others, slip almost as readily from it as from uncoated glass. In consequence of this I have for some time employed successfully an edging of rubber dissolved in chloroform, and find it all that those who have recommended the plan have claimed for it. It can be very neatly and rapidly applied by making a modified American clip so filed that the plate is gripped in a groove about a sixteenth of an inch in depth. This is lined with a strip of woollen cloth saturated with the solution, and the plates may be edged at the rate of a dozen in less than two minutes.

The two drawbacks to this method are the additional trouble in making the plates perfectly clean, and the fact that the solutions have a tendency to get between the film and the glass, which makes the complete removal of the hypo. a difficult matter, and consequently the coating of the entire plate with a suitable substratum is to be recommended.

This brings me to another of the minor troubles of emulsion workers, as, in conjunction with the substratum question, I have been trying to get rid of the evil in an easier and more satisfactory way than has yet been proposed. I allude to blurring, and the method of backing now generally adopted for its prevention. There are few emulsion workers who would not be glad to get rid of the trouble of smearing the backs of their plates with the sticky mess of sienna now employed, and of the disagreeable necessity of washing it off again previous to development. Mr. M. Carey Lea and others at one time recommended the staining of the emulsion itself with cochineal, aurine, &c.; but the system did not come into general use, mainly, I believe, because the action of the foreign matter considerably reduced the sensitiveness of the plate so prepared. The idea that I have been trying to work out is to combine the colouring matter with the substratum, and, so far, I have met with such a degree of success as to induce me to ask others to take the matter up, in the hope that some one will hit on the material most suitable for the purpose.

While satisfied with the rubber edging already alluded to, I got rid of the trouble of backing by applying a preliminary coating of collodion coloured with aurine. Such plates are easily prepared, and will of course keep indefinitely previous to the application of the emulsion, while there is not the same necessity for chemical cleanliness as where the emulsion is to be applied directly to the glass surface. A very pale tint effectually prevents reflection from the back surface of the plate, so rendering blurring from that cause impossible; and it is easily removed after its work has been accomplished, partly by the pre-development, moistening with dilute alcohol, and partly in the subsequent fixing and washing processes. But the desire to use a substratum over the whole plate led to the search for a different colouring matter—a search in which I have not yet been so successful as I hope to be. The substratum which at the present time I think is in every way most useful and convenient is a solution of india-rubber in benzole; but this latter, unfortunately, is a menstruum in which aurine is not soluble, although, probably, had it been so it would not have suited, as the rubber film is not easily penetrated by either alcoholic or aqueous solutions, and, consequently, its subsequent removal might have been attended with some difficulty.

What is wanted, then, is a colouring matter soluble in benzole and sufficiently unstable to be readily decomposed—*bleached*—by light. Of such substances the vegetable world includes a considerable number, although, as yet, I have only been able to experiment with a few. Of these, so far as I can see, the colouring matter of turmeric *(curcumæ)* offers the greatest chance of success. As the body of the film is necessarily thin the solution of colouring matter must be strong; and, probably, the easiest way to make it would be to moisten the coarse powder with the liquid and pack it closely, but not tightly, into the neck of a pretty large glass funnel. More of the liquid should then be poured into the funnel and allowed to percolate slowly through the turmeric, the colouring matter of which it will carry with it. In this way a very strong solution should be made, in which the necessary quantity of rubber may afterwards be dissolved. Plates coated with such a solution will be sufficiently deep in tint to prevent blurring; but it will resist the action of the various solutions used in development, and leave the finished negative slightly yellow in colour. To those who prefer to make thin negatives this tint will not only be unobjectionable but, while it lasts, a positive benefit, as it is pretty well known that such negatives print better in subdued light. In cases, however, where it would be objectionable it may readily be completely removed by a few hours' exposure to bright sunshine.

I do not, of course, present this as by any means the best material for the purpose; but, as I am strongly under the impression that there is a very decided advantage in the combination of the substratum and the blurring preventive, I am anxious to direct the attention of emulsion workers generally to the subject, in the hope that a perfect coloured substratum may soon be found.

John Nicol, Ph.D.

PRACTICAL INSTRUCTIONS IN MODERN PHOTO-MECHANICAL PRINTING METHODS.

Part I.—PHOTOLITHOGRAPHY.

III. Second Method of Preparing a Transfer.—The method of making a transfer which is now about to be described is a modification of a process due to Asser, of Amsterdam. Asser's process can be so far varied as to be rendered suitable for the reproduction of subjects in line or dot on one hand, or for the reproduction of half-tone subjects on the other hand; but in this latter case the reproduction takes the form of a grained or stippled picture. For the present let us pass over that modification of Asser's process which is adapted for reproducing half-tones, and consider how the method can be best applied to the reproduction of line or dot subjects. Now, it is well to bear in mind that, when the method is so used as to reproduce lines clearly and satisfactorily, there is still a tendency toward the reproduction of certain first approaches to half-tone, when these exist in the original. By taking advantage of this peculiarity of the process the adroit operator will often be enabled to obtain a satisfactory reproduction of subjects which are so ill-defined and grey in the finer parts as to defy the greatest skill and care of an operator employing the method already described. It generally happens that when the method which is about to be described is employed the lines are hardly so sharp and well defined as when the ordinary method is made use of; but this want of sharpness is so slight that it is scarcely noticeable unless a magnifying glass is made use of. In this case, as in many others, it is difficult to unite all desirable qualities in one process.

The quality of work producible by the method under consideration depends, to a very great extent, on the nature of the paper employed, as a clear and sharp definition of the lines can only be secured by the use of a paper having a smooth and even surface. It is imperative that this even surface shall be due to the natural quality of the paper, as a smoothness induced by heavy rolling is of no avail. Thin Rives paper is the most convenient material to employ, and a sheet of this having been placed in water, it becomes easy to distinguish the smooth side. This side being uppermost in the dish of water a piece of plate glass, which should be rather larger than the paper, is slid under the floating sheet, care being taken to avoid the inclusion of air-bubbles between the paper and the glass. The piece of plate-glass is next lifted out of the water with the paper on it, a slight grip on one or two points being sufficient to prevent the paper floating away. The next operation is to place the sheet of glass on a table, and by the application of a squeegee to remove the excess of water from between the paper and the sheet of glass. Before applying the squeegee it is well to cover the sheet of paper with a piece of waterproof cloth, or another sheet of paper, in order to prevent any damage to the surface of that paper which is about to be used for making a transfer.

The wet paper, thus fixed on a glass plate, must next be coated with a very weak flour paste, and this paste should be made by boiling together four parts of wheat flour and one hundred parts of water, care being taken to avoid lumps of unsoftened flour, and to strain the mixture carefully through muslin. The addition of a few drops of ammonia to the paste is an advantage, as even freshly-made paste is often slightly acid; and any acidity in organic materials which are to be rendered sensitive with bichromates is very undesirable. After the plate which bears the wet paper has been placed in an approximately level position its surface is flooded with the warm paste, about fourteen ounces of this being required for an ordinary sheet of demy paper. The plate must then be gently inclined, so as to run off the excess of paste at one corner. While the paste is being poured off it is as well to rock the plate just as one would do when collodion is being poured off in the operation of taking a negative. The plate carrying the pasted paper being now reared up on one edge to drain, a point will be noticed when the coating of paste tends to divide itself into little granular patches, which more or less resemble spinach seed. When this point is reached the pasted surface of the paper must be smoothed by means of a long-haired badger brush. This operation of smoothing the pasted surface requires some little practice in order to perform it satisfactorily. In doing this the brush should be held loosely in the hand, and the ends of the hairs should pass rapidly and lightly over the surface of the paper until an even surface is produced. The rocking motion given to the brush ought to start from the wrist, the arm being comparatively still. A satisfactory surface having been produced, the sheet of paper may either be stripped off the glass and hung up to dry, or it may be allowed to dry on the glass plate; but in this latter case it sometimes adheres unless the glass has been slightly waxed, as a trace of paste often penetrates the paper.

The dried paper may either be rendered sensitive by immersion in Husnik's alkaline sensitiser, already referred to, or it may be sensitised in a three and a-half per cent. solution of potassium bichromate to which a few drops of ammonia have been added; and after the paper has been soaked for a few minutes in either of these solutions it may be fixed up to dry in a warm place. When dry it should be exposed under a negative for about the same length of time as would be necessary in the case of a simply-gelatinised photolithographic paper; but, as the image produced on pasted or starched paper is very dark and vigorous, it is generally convenient to conduct the operation of printing in a frame provided with a jointed back, so that the progress of the operation can be watched from time to time. The exposure to light should be continued until the finest and faintest lines are distinctly impressed upon the paper. All examinations of the print must be made by non-actinic light, as a very short exposure to daylight would be prejudicial, and the hinged back of the pressure-frame should be so placed as to render it unnecessary to loosen more than a small fraction of the print when an examination is made. If this latter precaution were not taken there would be a considerable risk of losing the register of some of the lines, as exceedingly slight differences in hygrometric condition notably affect the dimensions of paper.

The exposure of the transfer having been finished, it is next placed in cold water in order to remove the free bichromate, and a few changes of the water are necessary. The transfer is then dried and placed between folds of paper, after which it is well ironed with a moderately-heated flat-iron. During this ironing those parts of the flour paste which have been made insoluble by the joint action of light and a bichromate acquire an increased degree of affinity for fatty matters and darken in colour, while those portions of the paste which were protected from the action of light are in no way altered by the heat of the flat-iron. After this ironing, the transfer is placed in cold water in order to soften the unaltered parts of the paste, and the next operation is to apply a fatty ink to the face of the wet transfer by means of a brush used after the manner of a dabber.

The kind of brush best adapted for this purpose is an ordinary small paint brush known at the oil shops as a "sash tool." Before this can be advantageously employed for inking the transfer it must, like a lithographic roller, undergo a preliminary preparation. The object of this preparation is not only to break up the tips of the hairs or bristles, but to so far saturate these bristles with fatty matter as to prevent any undue amount of water from penetrating them. The preparation of the brush is commenced by anointing it with printers' ink, and then beating the ends of the bristles on an anvil until the final eighth of an inch is battered and disorganised. More printers' ink having been applied, the brush is worked for a short time against a brick wall or some other rough surface, and, after a thorough cleaning with turpentine, it is ready for use. The ink is next prepared by mixing one part of ordinary letterpress ink with two parts of oil of turpentine, and fastening a piece of muslin over the neck of the bottle, so as to form a filter for the ink. Some drops of this having been shaken out on an inking slab, and well worked into the brush, a few minutes are allowed for a portion of the turpentine to evaporate. The wet transfer is then laid evenly on a slab of plate glass, and, after the excess of moisture has been removed by means of blotting-paper, the inking is commenced by gently dabbing the face of the paper with the inking-brush. This operation should be continued slowly and uniformly until every part of the transfer is charged with rather more ink than is required to remain on it, and if the whites become tinted it is of no consequence. Now free the brush from a superabundance of ink by working it on a clean part of the slab, and, after having flooded the transfer with water, resume the treatment with the inking brush; but in this case it is necessary to use a more rapid motion and a very light pressure. Under these circumstances the excess of fatty ink will become gradually cleared off, leaving the subject clearly defined. It often happens that some parts of the subject will require local treatment with the brush in order to do them justice, and it is just as well to have the original subject near at hand for reference during the clearing of the transfer. It is scarcely necessary to observe that those parts of the original which are formed of ill-defined, greyish lines should be reproduced in the same manner, otherwise the general effect of the original will be altogether lost. If the inking appear to be unsatisfactory the whole of the ink may be cleaned off with oil of turpentine, and the operation of inking can be recommenced.

Success in the operation of inking is only to be attained by a careful study of those conditions which lead to an abundant deposit of ink, and those conditions which lead to the deposition of a smaller proportion of ink, or which tend to remove the superabundance of ink from a highly-inked transfer. These may be classified as follow:—

Circumstances tending towards the deposition of much ink:—

1. Comparative dryness of the transfer.
2. The use of considerable pressure in applying the inking tool.
3. Thinness of the ink, or the presence of a considerable proportion of turpentine.
4. Slow movement of the inking brush.
5. A high temperature.
6. The use of a brush highly charged with ink.

Circumstances which tend towards the deposition of but little ink, or the removal of an excess:—

1. A flooding of the transfer with water or a solution of gum.
2. The use of but little pressure in applying the inking-tool.
3. The use of a stiff ink.
4. A rapid movement of the inking-tool.
5. A low temperature.
6. The use of a brush charged with but little ink.

In using the inking-brush it should be remembered that anything approaching to a brushing or dragging action should be carefully avoided, as this would certainly lead to the destruction of the coating of paste, and to the deposition of an unremovable film of ink on the unprotected paper. In dabbing the brush should always be brought down vertically on to the surface of the paper.

When all the lines are so inked that the transfer fairly represents the original engraving, it is merely necessary to remove the excess of moisture by the cautious use of blotting-paper, and then to hang up the transfer until its dampness is reduced sufficiently to fit it for transference to the lithographic stone.

It is important to bear in mind that transfers prepared with a quickly-drying ink, as directed above, very rapidly deteriorate by keeping, and they should, consequently, be transferred to the stone as soon as possible after they are made. When circumstances render it impracticable to put a transfer down on the stone within four hours after it is made a little tallow should be added to the ink employed, and when a short delay only is expected an addition of a tenth part of tallow to the ink will suffice; but if circumstances render it necessary to keep a transfer for a long time, or to send it abroad, it may be necessary to employ an ink containing a larger proportion of tallow, and this may amount to a fourth part of the ink, or a still larger proportion of tallow may be necessary in some cases. The addition of tallow should only be made when circumstances render it necessary, and even then the proportion added should be as small as possible.

The photo-mechanical student should bear in mind that many substances decompose certain bichromated organic matters just as light decomposes them, inducing insolubility in water and a tendency to adhere to fatty bodies. Among these deleterious substances may be mentioned the fumes of sulphuretted hydrogen and of sulphurous acid. The former of these often finds its way into the preparation-room in consequence of imperfect trapping of the drains, and the latter is a product of the combustion of coal gas containing sulphur. When coal gas is used in the photo-mechanical laboratory the greatest care should be taken to provide efficient means for ensuring the escape of the products of combustion. Many failures in photo-mechanical processes may be traced to the use of coal gas, and it is generally best to altogether avoid its use in rooms where bichromated gelatine or analogous products are dried, and, as a partial safeguard against the effects of any injurious vapours, it is well to sprinkle a few drops of ammonia on the floor.

In the next chapter the more especially lithographic details will be considered. T. Bolas, F.C.S.

THE PHOTOGRAPHIC EXHIBITION OF 1878.

May an old photographer who has seen many more exhibitions than he cares to acknowledge to venture once more to give his impressions? The present Exhibition, though small, is to my mind fully equal to any of its predecessors, and it has this great merit that there is a very much less proportion of inferior work than has hitherto found its way into these exhibitions. Whether this be due to a stern sense of impartial duty in rejections may be doubted, inasmuch as rumour points to a great lack of exhibitors coming forward; and this is corroborated by the evident filling up of space at the last moment, judging from the extent occupied by the collection of foreign work sent in by one well-known, ingenious artist. Be this, however, as it may, and although one misses many well-known names, there is work shown which has never been surpassed, though doubtless it may have been equalled on former occasions.

Photography would now seem to have arrived at a position in which farther advance can scarcely be imagined. Year by year it has progressed, and it would seem at the present time to have reached a high table-land of excellence. One thing may be noted—although this does not apply to the present year only—namely, the true introduction of clouds into the landscape. Doubtless, clouds have been taken before, and clouds have been introduced, but they have been more often rather as principals than as accessories. A change very much for the better has taken place, and the present Exhibition has numerous striking examples of their judicious and artistic introduction and treatment.

Looking at the landscape work shown it is impossible to conceive finer examples than those on the walls in Pall Mall. The painter may study them with advantage, and no longer look down on his brother photographer as a being to be despised. Light and shade, foreground and distance, foliage, and even water (till of late years a stumbling-block), aërial perspective, and that beautiful combination of detail with breadth—all read a lesson to the gentlemen of the brush which it would be well for them to study, instead of turning up their noses in disdain at what they are pleased to term "mechanical processes." Speaking of the landscapes: why does one of the foremost in this line persist in wilfully destroying the fine effect of his collection by jumbling them together in one black frame with thin divisions between each plate? In spite, however, of this injustice to his work its merit stands conspicuous. Separate frames—or, at all events, a thoroughly-marked division of one picture from another—would obviate that confused effect which the want of such treatment unfortunately engenders. The same evil genius spoiled his frame last year in a similar way, and his works in the French Exhibition are marred by the same inattention to effect.

The Exhibition of the present year has, in my mind, another great merit, viz., the absence of those patchwork photographs which have so often at previous exhibitions held prominent positions in the room, and in which the artist has with mistaken ambition aped the painter and endeavoured to effect by photography what he deemed the superior merit of a picture, whereas he only achieved a something which had all the necessary inherent defects of the hand and marred the wondrous special quality of the photograph. He, in effect, by his manipulation—however ingenious and laborious the process—only succeeded in thoroughly destroying the charm of the photograph by combining with it those very defects which are necessarily incident to the brush, and which the true artist would only be too glad to get rid of.

In portraiture, too, great results are achieved, though it must be admitted the enlarged "life-size" attempts in this branch are not of the happiest character. It is singular that the one figure selected for a medal from the clever illustrations of Shakespeare's *Seven Ages* should be deficient in the special characteristic attributed to him by the poet. Where is "the beard of formal cut?" The Justice has a carefully-shaved chin; why the omission? Photographers are sometimes careless in their selection or in the treatment of their models. A fisher girl seated on a rock netting has unfortunately forgotten to take off her gold and jewelled bracelets—somewhat incongruous adjuncts for a young woman engaged in such an occupation.

The enlargements in carbon of landscapes and interiors are worthy of every commendation, and the same may be said of the charming Woodburytype productions. Whilst on carbon printing it may be remarked that, with very few exceptions, there are no carbon prints in the Exhibition. Why is it that photographers will stick to the old more or less evanescent processes of silver when they have a permanent process at their command? A staunch conservatism seems to possess them, in spite of all that is done and written and the successful specimens shown. That carbon can equal silver is undoubted, and the manipulation is certainly as simple and easy as its rival.

There are some ingenious pieces of apparatus; but why in the electrical arrangement for effecting exposure adopt a shutter for covering and uncovering the lens, which is thoroughly faulty in principle, as it necessarily gives a longer exposure to one part of the other? In the pneumatic method a better arrangement is adopted; but neither of them effects anything like rapid or instantaneous exposure. There is no reason why this should be the case.

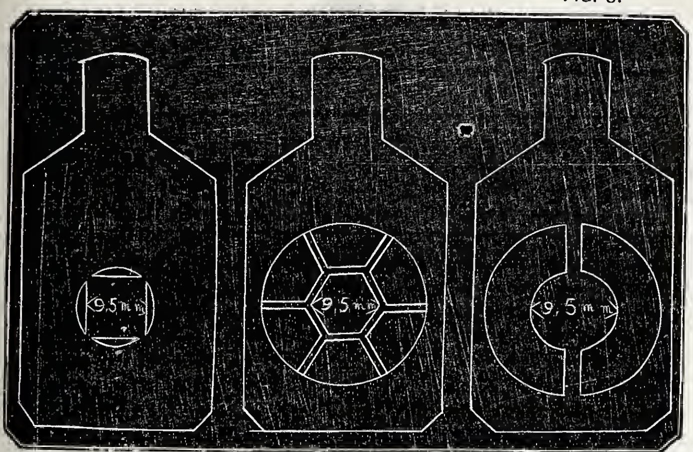
Taking it on the whole, the Exhibition is well worthy of more than one visit. An Old Photographer.

FOREIGN NOTES AND NEWS.

Another New Stop.—Dr. Vogel on Photography as an Art.—Polychrome-Autography.—Another Method of Drawing the Negative Off the Glass Plate.

In The British Journal of Photography for September 13th, under the heading of *Recent Patents*, will be found an account of the way in which Herr Lehmann proposes to take single photographs which he believes will possess stereoscopic relief. This patent has, it seems, attracted the attention of another inventor. Herr Paul Gliese writes to the *Photographisches Wochenblatt* that he was much astonished to see that the stops recommended by Herr Lehmann were, as from the illustration he could convince himself, the same as he formerly used to produce "plastic" pictures. Now, however, he uses the stops *figs.* 1, 2, and 3 in the following way:—In looking at an object one not only sees a little to the right and left of it, but also a little both above and below]; therefore with this stop he draws out the focussing-glass from its focus, so that the picture not only goes from right to left, but also up and down (?), and by focussing sharply he covers these pictures. Thus he obtains a circle round the object which enables him to get "plastic"

FIG. 1. FIG. 2. FIG. 3.



results. He then arranged the stops, *figs.* 2 and 3, with which he gets the same plastic results, and all three are, he says, preferable to the stops with two openings recommended by Herr Lehmann. The stops shown in the illustration belong to a Voigtländer euryscope, and the diameter of their centre is nine and a-half millimeters.

In Moll's *Notizen* Dr. Vogel discusses the question—"Is photography an art or not?"—which, when photography is understood to mean merely the physico-chemical process, he answers by "no." But, if all the points which a photographer must keep in view in the production of a beautiful picture—namely, tasteful posing, artistic lighting, and arrangement of the surroundings and well-judged retouching—be included, he would say that photography is at least partly an art. Still he is very far from admitting all photographs to be works of art, and with these and his subsequent remarks most candid photographers will agree. Thus, there are many photographers who think that when they have lighted a face *à la* Rembrandt they have produced a work of art, when they have merely produced a peculiar effect of light and shade, which is by no means necessarily a work of art.

Then, again: In placing photographs in competition with paintings the photographer's work is often rendered inartistic—not from any lack of artistic feeling in himself, but by the unadaptable and unidealisable (if it be permitted to coin such a word) nature of the materials he has to work with. For instance: a photographer may desire to pose a living model so as to suggest some well-known *genre* painting. Here the photographer has to contend with difficulties which do not beset the painter. Dr. Vogel instances Meyer's *Girl Reading.* The subject is a pretty child, of about twelve years of age, sitting at a window, with a large book in front of her, over the top of which she looks coquettishly at the spectator, the lighting being Rembrandtesque,. There is a photograph in the market, taken from a living model, posed after the manner of the painting, which, as far as the lighting, pose, and costume go, is exceedingly successful, corresponding almost exactly to Meyer's picture. Unfortunately the model has a somewhat indifferent and even *blasé* expression, instead of the smilling, coquettish look of Meyer's original; also the large hands distract the attention, and the white dress on the light side of the picture appears merely a white splash without any detail, while the corresponding part of Meyer's picture is painted in his most artistic manner. This is, then, one of the weak points of photography, considered as an art; for, as no one needs to be told, if Meyer's model have not naturally the exact expression he desired, he could idealise it. If her hands were too large he need not represent them at their full size. But the poor photographer is helpless.

In support of his theory that a photograph from a living model is seldom a perfect work of art, even with the best will and taste on the part of the arranger of the picture and the best of models—because in the few minutes taken to arrange things all imperfections cannot be taken in at a glance, and they are often not perceived until the photograph taken is examined at leisure—Dr. Vogel gives some other examples, one of which may be cited. A clever photographer of his acquaintance once wished to imitate Plockhorst's *John and Mary Returning from Christ's Grave.* The whole composition contained only two figures, dressed in brown drapery, with a daybreak sky background. The photographer found two suitable models and proceeded to arrange them, but in spite of all he could do the result was stiff. The two models were, as far as regards their heads, of the desired type, and the best that could be procured, but there their suitability ended. The female model was much too short for the *John,* and consequently could not group with him so as to suggest Plockhorst's picture, while she could not call up the desired expression of anguish for the Madonna's face. Then in the original the apostle was barefooted, and even that particular, though but a minor matter, it was found impossible to reproduce, owing to a malformation in the foot of the model. Verily the troubles that afflict the enterprising artistic photographer are many!

The *Papier Zeitung* says Herr Holtzmann has just invented and patented a process which he calls "polychrome-autography," by which a number of impressions can be taken from a drawing in one or more colours. The inventor supplies the prepared colours and papers, which are all that is required for the preparation of about twenty-four proofs. The drawing is made in the ordinary way with drawing pencils and brushes dipped in the prepared colours and upon the specially-prepared paper. The finished drawing is then laid, face downwards, upon a piece of previously slightly-moistened "negative paper." The impressions are got by laying this negative upon good, stout, white paper, also previously moistened, and rubbing it down with the hand, no other pressure being required.

The *Photographisches Wochenblatt* describes a method of drawing a negative off the glass plate:—The plate to be used is first cleansed from all greasy matter by washing, first, in a warm solution of soda, now soaking half-an-hour in a solution of one part of nitric acid to ten of water, then rinsed well under a tap, and, lastly, the still wet plate is rubbed with a rag and whiting until a thick paste is formed, which shows the lines of rubbing distinctly. Both sides of the glass having been so treated with the whiting the plate is allowed to become perfectly dry, and is then polished. The following solution is meantime prepared:—

Caoutchouc (cut in small pieces)	100 grammes.
Chloroform	250 ,,

Solution will have taken place in a couple of days, frequent and powerful shaking of the mixture being required. Of this solution of caoutchouc five grammes is added to 250 grammes of the purest benzine, and the whole is filtered through cotton wool, after which it is ready for use.

Pour a little of this last solution over the carefully-cleaned and dusted plate, and let the overplus run off upon a cotton filter. In about half-an-hour the film is dry; but the older the film the better it is, unless the plates are stored in an oven. The emulsion or, if the wet process be worked, the collodion is then poured over the plate, which is converted into a negative in the ordinary manner. When the latter is finished and sufficiently rinsed, place it for a few seconds in hot water, in order to warm it; now let it drip, and then coat it with the following solution, which has previously been filtered through muslin:—

Water..................................	100 grammes.
Gelatine..............................	6 to 8 ,,

In summer one gramme of glycerine may be added for every ten grammes of gelatine, and in hot climates this quantity may be slightly increased. Too little glycerine makes the gelatine film hard and brittle; too much makes it sticky. Before coating with the gelatine place the plate level on a tripod and spread the fluid with a glass rod. Dry in a *horizontal* position—preferably in a drying-box, which may be made perfectly level by means of adjustable screws, and in which it may be placed as soon as it has stiffened. The drying-box may be warmed by a spirit lamp for the first hour. When the gelatine film is perfectly dry varnish with retouching varnish, or, if the negative do not require to be retouched, coat it with thin raw collodion; then run a knife round the edges of the plate, and draw off in the usual way.

OPINIONS OF THE LONDON DAILY PRESS ON THE PHOTOGRAPHIC EXHIBITION.

Photography.—The Photographic Society of Great Britain has now opened its show for the year at the Gallery of the Society of Painters in Water-colours in Pall Mall East. In spite of the discoveries in the production of artificial light, which threaten to work a revolution in photogeny, the past year has been distinguished by no sensational developments in photography. The most interesting, perhaps, of the methods illustrated at the Photographic Exhibition is that by which a near approach to photographing in colours is secured. The Lombardi Art Company have applied with novel care and skill a method of representing colours which is called "poikilography." A photograph in monochrome is enlarged from a negative in the usual way and transferred to thin paper or canvas. Colours are laid on by the hand on the reverse side, and show through. The colours may be roughly applied, and are without shading. The most delicate shades are supplied by the photograph. The effect of paintings by Rubens, Holbein, and other old masters is admirably reproduced. A portrait from life (of Miss Curwen) taken according to this method appears to be pleasing so far as the very bad position given to the picture on the stairs enables it to be judged. This situation is allotted to the picture because the rules of the Society exclude hand colouring from the rooms of the show. The time, perhaps, will come when photographs in colours will be produced wholly by natural means. The prismatic spectrum has been reproduced on the daguerreotype plate, and also on specially-prepared paper, in colours which approached the original, although they were wanting both in truth and fixity. In the meanwhile such approximations as those of the Lombardi Art Company, or M. Vidal's variously-coloured gelatine films, are to be welcomed. The points most to be noticed in the methods of plain photography are the increasing use of dry plates, and the advantages gained by the processes of enlargement which the Autotype and Woodbury workshops have brought to perfection. A small photograph can be taken much more rapidly than a large one: and speed is obviously desirable in dealing with cloud and wave as well as with the mobile faces and attitudes of living beings. The Exhibition is full of examples of large pictures with unlimited wealth of detail produced from negatives in which the naked eye discerns only coarse masses of black or brown. The Society has adopted the practice of giving medals for the objects exhibited. The jury was compossd of Mr. Poynter, R.A., Mr. John Brett, Mr. James Glaisher, F.R.S., Messrs. F. Bedford, H. P. Robinson, E. Piercy, and H. White. The medal for the best landscape has been adjudged to the School of Military Engineering, Chatham. As it is in landscape that the Exhibition, in common with English photography in general, is peculiarly successful, the honour is the greater for the students of this military school, who are usually employed in photographing machinery, guns, and military positions, and only in their holiday time take the beautiful scenes such as that near Bettws, which has won for them the medal this year. The medal for the best series of landscapes is awarded to Mr. Vernon Heath. The views thus distinguished comprise the hills of Skye—Blaven, from Loch Hart of Corrie; Marscow, from the Red Burn; Blaven, from Scour-na-Gillian; Scour-na-Gillian, from the Red Burn, studies of stone-heaped fells with mountains in the background. In these a great difficulty of the photographer has been overcome. The distance and the foreground are rendered with equal success. The figure study distinguished with a medal by the judges is one of a series of enlarged illustrations to Shakspeare's Seven Ages in *As You Like It.* It is the figure of the Justice, "with eyes severe and beard of formal cut," by Mr. A. W. Wilson. The *genre* picture selected for a medal is *The Broken Leg*, a dog with his leg bandaged—the subject of the anxious solicitude of a little girl. The photographer who succeeded in obtaining quietude from these difficult subjects is Mr. George Nesbitt, of Bournemouth. The Woodbury Company gain the medal for the best photo-mechanical prints. By their remarkable process the thin films which form the light and shade of a photograph are pressed into a metal slab, which is thus excavated into an engraving block. The book illustrations shown for the medal are perfect in delicacy and distinctness of linear engraving. The medal for apparatus has been won by the well-known firm of Marion and Co. They exhibit Cadett's patent pneumatic photographic shutter. The object of this invention is to open and close rapidly access to the lens while the operator engages the attention of, for instance, a child who is being photographed. The photographer has merely to press an elastic ball like the handle of a pneumatic bell, and the pressure is conveyed by a slender india-rubber tube to the instrument. A little cap is by this means rapidly raised or lowered. The pneumatic apparatus is much more portable than its competitors worked by electricity. Additional medals were placed at the disposal of the judges for any novelty, or other form of excellence, in process or result. One of these was given to Mr. Payne Jennings for instantaneous effects in pictures of yachts in full sail upon the sea. The camera in these views comes as near to representing motion as is possible. In the 400 entries catalogued (many of them series of objects) there is much of interest besides the pictures or instruments for which medals are awarded. Mr. Warnerke has lent a large collection of Russian and Swedish photographs. Many of these were taken by the State establishments of the Russian Empire, and some are remarkable illustrations of the processes known as heliogravure, hyalotype, &c. There are several fine portraits in the Exhibition, but as specimens of pure photography some of the best were disqualified for the medal by having been improved by hand. Mr. Faulkner's work is peculiarly soft and pleasing. He transfers a photograph to opal glass and completes it with sepia. The portraits of Mrs. Alfred Morrison and of Miss Bertha Ellis are particularly noticeable. The portraits taken by M. Boucher should not be overlooked. Mr. Dixon's representations of the heroes of the Zoological Gardens, the views on Loch Morah, taken by Mr. W. J. A. Grant, of Arctic fame, Mr. England's valuable series of plates recording the buildings erected for a year on the slope of Trocadéro and on the Champ de Mars, Captain Abney's photographs of the Swiss Alps and the Welsh Hills, Mr. H. Garrett Cocking's *Gitana*, and other character sketches are among the many good pictures of the show. Messrs. Wratten and Wainwright's photographs, from negatives taken by the instantaneous gelatine plate exposure, will be interesting to photographers as examples of the increasing use of the dry-plate method. Mr. Bennett sends a transparency taken on a winter's night by candlelight and lamplight. The subject was entirely in still-life, and an hour's exposure explains the perfection of the picture. Ceramic photography has made less progress than could have been desired, but some pretty applications of photography to cups and saucers are to be found in the Exhibition.—*The Times.*

Meetings of Societies.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The annual meeting was held at the Memorial Hall, on Thursday evening, the 10th inst.,—Mr. Alfred Brothers, F.R.A.S., President, in the chair.

After the minutes had been read and passed, the President read the

ANNUAL REPORT.

In the annual report of the past session your Council have the pleasure of stating that the Society is in a condition of full average prosperity. Members retire, but others enter, and the members at the annual meeting are tolerably even.

The attendance at the monthly meetings has been good, and the members have been liberal in the supply of interesting matter and objects for investigation and examination. Papers on set subjects, for some reason, appear to be going out of fashion; but as long as the interest of the meetings is sustained in other ways this need not be the subject of serious regret.

The Treasurer will inform you of the financial position of the Society. There are at present 72 members on the roll, against 70 at the last annual meeting.

The average monthly attendance has been 33, against 29½. The least number at any meeting was 29.

Four papers have been read before you as follow:—

On a Process of Reducing Silver Chloride to the Metallic State. By Mr. J. W. Leigh.

On Double Printing of Transparencies for the Stereoscope. By Mr. S. H. Ashley Oakes.

On the Gelatine Process, and the Preparation of Dried Pellicle. By Mr. T. Chilton.

Mr. W. J. Chadwick, in addition to many other interesting contributions, read a paper, by Mr. Woodbury, *On the Modern Magic Lantern.*

Mr. McCall, on behalf of Mr. F. York, exhibited a Keevil lantern, and demonstrated the capabilities of the instrument.

Mr. D. Young also exhibited one of Keevil's lanterns, perfected.

Many other interesting things, which it is not necessary to dwell upon in this report, have been brought under your notice, for which your Council beg to thank the several contributors.

The February meeting was a great success; an excellent supply of comfortable things enabled the unusually large company to practice the wet and dry processes to their entire satisfaction. You had on that occasion the pleasure of entertaining some of the leading members of the Liverpool Amateur Photographic Association.

As regards the proposed *soirée:* your Council were invited by the Peel Park Museum Committee, under exceptionally favourable and liberal conditions, to hold an exhibition of photographs in their building, in connection with the opening of the new wing for art purposes. The Secretary of your Society, however, received so little response to his applications for exhibits that the invitation had to be declined.

The only outdoor meeting of the season, to Hawarden, though late, was a real success as regards enjoyment, and probably so photographically. This meeting, as you are aware, was held jointly with the Liverpool Amateur Photographic Association.

Your Council, in conclusion, have to thank all the members who have contributed in the least degree to the success of the session; and they take this opportunity of tendering their acknowledgments to the Belgian Photographic Society for the periodical transmission of that Society's *Bulletin.*

The annual report received the confirmation of the meeting, and the election of officers and Council for the ensuing year was proceeded with, and resulted in the election of the following gentlemen:—*President:* Thomas Haywood, Esq.—*Vice-Presidents:* Mr. A. Brothers, F.R.A.S., Rev. Canon Beechey, M.A., G. T. Lund, M. Noton, and J. Wade.—*Council:* Messrs. Charles Adin, R. Atherton, J. J. Kershaw, J. W. Leigh, S. H. Ashley Oakes, J. C. Sewell, E. Woodward, J. Warburton, N. Wright, and James Young.—*Treasurer:* Mr. W. G. Coote.—*Honorary Secretary:* W. J. Chadwick, Prince's Bridge Iron Works, Salford.

A vote of thanks was passed to the ex-President, the ex-Secretary, and the Treasurer.

Some of the members who were present at the recent outdoor meeting exhibited the results of their day's work.

The meeting, which was thinly attended, was then adjourned.

THE RHENISH, WESTPHALIAN, AND FRANKFORT PHOTOGRAPHIC SOCIETIES.

The above Societies had a joint meeting, at Lorch am Rhin (half way between the two usual meeting places—Cologne and Frankfort-on-Maine), on the 30th August, on which occasion the whole day was devoted to the discussion of photographic matters. Photographers from many other parts of Germany were present, besides members of the two societies mentioned above.

On the chair being taken by Herr Baumann, who was elected President by acclamation, Dr. Schleussner was chosen Secretary, and the meeting proceeded to discuss the points set down in the order for the day.

I. The first subject discussed was the assistant and apprentice question. All the speakers were unanimous in deploring the dearth of capable assistants, and to bring about a better state of matters it was declared advisable that no master should engage an assistant who had not served a three years' apprenticeship, or who could not produce a certificate of discharge from his last employer.

Herr Criefelds thought that in this way masters would have things in their own power, though in large towns he would recommend that the apprentices who had finished their time and were desirous of being engaged as assistants should be examined by a committee of photographers.

The scarcity of skilled retouchers was then mentioned, and was attributed to the dearth of suitable technical schools.

Herr Rheinstädter thought that such schools should be placed in connection with a school of art, so that men who showed themselves to be possessed of considerable skill with the pencil, but of little or no talent for painting, might be induced to turn their attention to retouching. Their final practical training must, however, take place under the eye of a practical retoucher; and it was recommended that such a training school for retouchers should be under the direction of a committee of the best retouchers.

Herr Geldmacher's experience was that the best retouchers were not painters, nor were they trained at the academy of painting.

Herr Baumann wished to see it established as a principle that the number of apprentices should never exceed that of the journeymen assistants.

A committee of six was appointed to consider the matter and report.

II. Point two had reference to the price and quality of albumenised paper. Here it was resolved to put pressure on the manufacturers of paper to induce them to abate their prices, and a committee was appointed to consider the subject of the ways and means.

III. and IV. Points three and four were the transmission of collodion by rail and Boissonnas's extra-rapid process.

One of the speakers on the last-named subject said the extra-rapid process was called the "lightning process" in America; but there it was beaten by Ingles' (of Montreal) double-lightning process. In Montreal, for the sum of twenty dollars, one could obtain the right of buying the requisite collodion, silver bath, and developer.

Dr. Schleussner then showed two negatives taken, in one and two seconds respectively, by Dr. Richard's rapid process. The negatives in question were pronounced well brought out and very delicate in the details, but slightly fogged. No prints accompanied them.

Telegrams, expressing regret for enforced absence, were received from Herr Quidde on behalf of himself and several other members of the Berlin Association for the Cultivation of Photography, and from Herr Festige, of Erfurt.

It was resolved to have another conference next year, the meeting-place to be Cologne. The meeting was then closed, and was followed by a supper, which was in turn brought to a conclusion by those present drinking to the sentiment—"Till we meet again at Cologne."

Correspondence.

MR. HENDERSON AND HIS ENAMELS.

To the Editors.

Gentlemen,—I am at a loss to conceive what spirit of mischief whispered into the ear of Mr. A. L. Henderson the counsel to rush into print upon the subject of his enamels at the French Exhibition, and, moreover, for what reason Mr. Henderson ignores the ordinary courtesy of communicating to his correspondent the fact that he is going to publish his letter; however, matters of courtesy give way to matters of fact. Here are the facts. In our monthly *brochure—Autotype Notes—* I wrote the following:—"In enamels England is far behind. It is absolutely worth while for any one giving attention to this special branch to go over, if for nothing else than to see the splendid photographic enamels in the French department." Then follows a description of what I considered the most noticeable enamels exhibited by the French artists.

In the article itself I instituted, as far as my ability went, a comparison as to the progress made by various countries in the different branches of the photographic art; and I submit that in my treatment of the enamels there was nothing whatever to cause Mr. Henderson to feel aggrieved, for he was not even named. Why, then, take the cap and fit it so elaborately upon his own brows?

He tells us that the jury have awarded him a bronze medal. Well, they could only have done less by giving him "honourable mention." If he is satisfied with his "bronze" well and good; but I would just point out the fact that, whilst the jury gave him a bronze they gave M. Walery a *gold* medal, and the Comte de Roydeville and M. Deroche a *silver* medal each. It was the enamels of these three gentlemen that I especially named as being so exceedingly fine, and surpassing anything of the same kind shown in the English section.

Mr. Henderson asks if I shall be surprised to hear that he has got a bronze medal; by no means. I think the award is a very just one. I am sure that if he is satisfied I am satisfied; and in conclusion I will willingly forgive his want of courtesy, and promise him that whenever he exhibits his enamels he shall have the benefit of whatever critical acumen some thirty years of experience in photography has bestowed upon me.—I am, yours, &c., J. R. Sawyer.

Ealing Dene, October 15, 1878.

P.S.—Pray pardon a "P.S.;" but what does Mr. Henderson mean by saying I am "neither a giant nor a dwarf?" Is it meant for a joke?—J.R.S.

PHOTOGRAPHY BY ARTIFICIAL LIGHT.

To the Editors.

Gentlemen,—*Apropos* of the extended use of artificial light in photography: I do not think that photographers who desire to use electrical illumination will readily find a better system than the following:—Pull down the white blinds of the studio, light them by a source of light screened from the sitter, and—"fire away!"—I am, yours, &c., D.

October 16, 1878.

Serious Fire.—We have received the following note from Messrs. G. Matland & Co., 120, Commercial-road East:—"We regret to inform you that our stock and premises having been destroyed by fire we are compelled to suspend business until further notice; but all orders now in hand will be executed as soon as possible."

Obituary.—We regret to perceive, from *The St. Louis Practical Photographer*, that an announcement of the death of Mr. John L. Gihon, of Philadelphia, had been received just before going to press. Mr. Gihon was an artist of merit, and well known as an able writer as well as a practical manipulator. He died on board the schooner "Anita," on the 16th ult., on his way home from Venezuela, and was buried at sea.

Robberies.—At the Marylebone Police Court, on Tuesday last, Henry Turner, aged 23, of 15, Alasia-road, Kennington, photographic printer, was charged on remand with stealing, on the 5th inst., a photographic lens, value £7 10s., the property of Rowland Taylor, his master, a photographer, at 369, Edgware-road. —Detective-sergeant William Crane, X division, produced evidence of other robberies by the prisoner, and asked for a further remand, as it was believed that other cases could be found against him.—The application for a further remand was granted.

Suicide of a Photographer.—Mr. C. W. Holloway, photographer, of 107, Clarendon-road, Notting-hill, London, has committed suicide at Henley-on-Thames, under very extraordinary circumstances. It appeared from the evidence taken at the inquest on Thursday, the 10th instant, that on the previous Thursday the deceased arrived at Henley, and took lodgings at the Black Horse Inn, Friday-street; and although nothing strange was noticed about him at the time, it was soon apparent, from the curious questions he asked, that he was suffering from much mental anguish and aberration. A day or two afterwards, while out for a walk with the landlord of the house, he suddenly exclaimed that everybody was staring at him. Nothing further occurred, however, until the following morning, when, after he had finished a hearty breakfast, he asked for pen, ink, and paper, and went upstairs apparently with the intention of writing a letter. A quarter of an hour later he was found with his throat cut, and although medical aid was speedily obtained he expired within about an hour. In the room was found a paper, with the following written upon it in pencil:—"Believe me all, as I now go before my God, whom through Jesus Christ I believe I shall be saved, this hunting me I can see is a dreadful conspiracy to deprive me of my father's or mother's money. I will blame no one. I am perfectly innocent of any crime but drink." The jury returned a verdict of suicide while in a state of temporary insanity.

The Medal Awards at the French Exhibition.—We have received, from Mons. A. Liebert, of Paris, printed copies of letters addressed by him respectively to the President of the Jury of Class XII. and to his photographic *confrères*. In the latter of these he complains bitterly of the unfairness of the awards made in connection with Class XII. He says the Jury have finished their labours long ago, yet the list has not been officially published, but almost all interested know the results. He also complains that the Jury are either incapable or animated by sentiments of partiality, the awards being so unjustly distributed having caused so many complaints to be made to the President of the Jury, who, however, does not condescend to reply. He (M. Liebert) sent a letter on the 29th August, and which was published in several journals (a copy of which is on the second page of his circular), remains unanswered, proving, to his mind, that the Jury have no argument to justify their conduct. He would like his *confrères* to inform him of their opinion of the works exhibited in the Champ-de-Mars, and encloses a list of awards, so that they may judge of the merits. M. Liebert complains in his letter that other works similar to his own have received much higher rank, and protests against the judgment given in his case. He declares to the President of the Jury that he refuses to accept the silver medal awarded to him, giving the President permission to dispose of it in favour of somebody else, and refuses to have anything more to do with exhibitions.

Fatal Oxyhydrogen Explosion.—The numerous friends of Messrs. J. Wrench and Son, opticians, and well-known lantern manufacturers, Gray's Inn-road, will be shocked to learn that Mr. Edward Wrench was killed by an explosion on Wednesday afternoon last, under the following circumstances:—The report of a loud explosion at the time mentioned caused great alarm among the occupants of chambers in Gray's Inn. It was soon ascertained that something serious had happened at No. 30, Gray's Inn-road, occupied by Messrs. J. Wrench and Son, opticians and this having been reported to the fire brigade station in Holborn a curricle was soon in attendance from that depôt. At the time of the explosion Mr. Wrench, Sen., and his clerk were in the office on the ground floor, and both of them were greatly startled by its force. The other persons in the house were the son of the proprietor and two women—one named Elizabeth Gibson, and the other known as "Kate." They were all on the second floor, the two women being engaged in their ordinary occupation, whilst Mr. Edward Wrench was in the act of preparing some oxygen gas for the working of magic lanterns. The explosion of the retort, which has not yet been accounted for, was not preceded by any warning, and the escape of the two women with their lives is said to be marvellous. The moment the father had recovered from the shock he proceeded upstairs to ascertain the extent of the mischief, when he met his son staggering from the room in an unconscious state. He caught him in his arms, but the weight of the body being beyond his strength, he was obliged to let him fall on the floor. Dr. Taylor, of Gray's Inn-road, was immediately summoned, and he pronounced life extinct. The force of the explosion seemed to have caused portions of the retort to enter the young man's side and penetrate the lungs, and the injuries were otherwise severe. The deceased was only twenty-four years of age. The two women also sustained injuries about the face and hands. The room where the explosion occurred was greatly shattered, and the windows were forced out.

EXCHANGE COLUMN.

I will exchange a 15 × 12 mahogany studio camera with two fronts (little used) and table stand on castors for a good 12 × 12 field camera and tripod stand.—Address, W. Perry, Hythe, Kent.

I will exchange a brass-bound 10 × 8 Kinnear camera (leather bellows), two slides, and single lens, for 5 × 4 pocket camera and lens and three double and one single slides, or offers.—Address, Geo. Duncan, Tanfield, Edinburgh.

Wanted, a pair of stereo. lenses or lens and camera in exchange for bath for 10 × 8 plates, large tray (two inches deep) 14 × 12, and another; three volumes of *Photographic Journal*, 1875-6-7; other articles or cash adjustment.—Address, Wilkie, 13, Little Trinity-lane, Queenhithe.

ANSWERS TO CORRESPONDENTS.

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

Photographs Registered—

Lewis and Co., Ranelagh-street, Liverpool.—*Portrait of Prince Bismarck.*

Alfred Pettitt, Keswick.—*Portrait of Alfred Scott Gatti, and Two Portraits of Madame Albani.*

PHOTO-MECHANICAL CORRESPONDENCE.

F. Carter.—Certainly not.

B. L.—The object of adding alcohol is twofold: it not only prevents the solution of the film of albumen, but it also accelerates the drying of the paper.

Litho.—The tint is quite arbitrary; but, having selected one which suits your eyesight, you had better adhere to it as far as practicable. Greater exactitude is generally attained by the use of a large number of light tints than by employing a small number of darker ones.

GENERAL CORRESPONDENCE.

Notice.—Each correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

Delighted Visitor.—The fine pictures to which you refer were all obtained by the wet collodion process.

P.—We shall make private inquiries, and if we are successful shall reply to your queries in a succeeding number.

Art.—The whole secret lies in the addition of bromide. Add nearly twice as much as you have hitherto been in the habit of doing.

Country Photo.—You have added by far too much sugar to the bath. Rectify this by the addition of an equal portion of solution not containing any.

A. R. R.—The focus of the lens is too long in the proportion of one-third. A *carte* lens possessing an equivalent focus of seven or eight inches will answer very well.

T. O. B.—To blacken the inside of the camera apply a mixture of spirit varnish and lampblack. For imparting a finish to the *outside* French polish stands unrivalled.

M. G. Haberer.—We are not acquainted with any other method by which sulphocyanide of mercury is made than that which is described in the various treatises on chemistry.

G. H. S. P. (Brixton).—If the strength of the silver bath be considerably reduced the bronzing of the shadows will disappear. Try the effect of sensitising a sheet of paper in the same manner as you have been accustomed to do of late, and then laying it down while quite wet upon a small quantity of distilled water contained in a flat vessel.

Joseph Greenwood.—After dissolving the chloride of strontium—the solution being somewhat strong—obtain a small piece of very clean sponge, charge it with the solution and apply to the glass in horizontal sweeps.

G. B. Baxter.—The gelatine may be very easily clarified by liquefying it at a low temperature, then incorporating white of egg very thoroughly with it, and finally raising the temperature until the albumen is coagulated.

Cynthia.—The number containing the article respecting which inquiry is made has been out of print for several years; but if you call at the Publishing Office of this Journal you will be afforded an opportunity of reading it.

W. T. P.—So far as we are aware everything requisite to be known in connection with this interesting invention has been published in our columns. If you will put your queries in a definite form we shall be glad to reply to them.

Amateur Photo.—Trim the prints previous to toning and fixing them; after washing them place them neatly one over the other in a pile and subject them to pressure. They are now ready for being mounted. After making a few trials the operation will become easy.

M. S.—When we state that as soon as an "answer" is written the letter calling it forth is thrown into the waste-paper basket and never more seen by us you will readily perceive the impossibility of our "referring back." Re-state the matter and embody the addenda contained in the present letter, and we shall endeavour to carry out your wishes.

C. T.—We cannot indicate any means by which you will obtain *fuller* information than those which we have so repeatedly given. We imagine from your query that you are not a regular reader of this Journal and our Almanac; but it would be foreign to the intention of this column of "Answers to Correspondents" to devote it to the republication of matter accessible to every reader.

F. Harrington.—1. The porous nature of the collodion will account for the water getting under it. To ensure its not obtaining access at the margin of the film, "edge" the surface of the plate with a substratum.—2. To secure enlargements on paper by means of the lime-light magic lantern make use of iodised paper excited by means of aceto-nitrate of silver. A warm solution of gallic acid is usually employed as the developer in such cases. The tone is controlled by the addition of silver.

Tyrol.—We must decline to offer any opinion respecting the merits of the burnishers mentioned, so far as regards the "validity-of-patent" point of observation. Any counsel who is conversant with patent law will give you an "opinion" for five guineas. You would derive much advantage by coming to London and making a rigorous inspection of the various patents for photographic burnishers, and also by studying carefully a set of the back volumes of The British Journal of Photography.

Ed. S. Wilkin.—The data at command is too imperfect yet to enable us to offer any opinion respecting the regular use of the electric light in the studio. While we have a strong conviction that the system of lighting will eventually be revolutionised by its means, we shall defer for a few weeks giving our ideas concerning the manner in which it can best be done. In the meantime we reiterate a statement we have several times previously made, namely, that it is possible to obtain quite as good portraits by artificial light as by natural light, provided due care be taken in the manner in which the light is directed upon the sitter.

Frederick Holt.—1. It is indeed exceedingly difficult to institute a series of systematic experiments under the circumstances in which you are placed, and if you obtain results different from those to which you have made reference you deserve much credit.—2. The principle upon which the Nicol's prism acts is this:—A ray enters a rhomb of Iceland spar, getting split up, or divided, into the "ordinary" and "extraordinary" elements of which it is composed. In direction these are divergent. Both fall upon the oblique central surfaces of the prism, which are cemented to each other by means of Canadian balsam, which, having an index of refraction intermediate between that of the spar for the ordinary and extraordinary rays, acts upon the elementary part of the ray which is most refracted as a totally reflecting mirror. By this means that ray is ejected through one side of the prism, allowing the other ray to be transmitted through the end.

An Inquirer into Spirit Photography.—Feeling it to be impossible to give, *seriatim*, replies to your numerous queries, we shall confine ourselves to a general reply based upon your letter. Buguet, the Parisian spirit photographer, was sentenced to one year's imprisonment on account of frauds practised upon the public, and when he was tried he confessed to these frauds. He yielded up to the French police the figures or marionettes from which he produced the "spirits" visible on the plates that were afterwards developed. Now, these are facts that stand attested in the history of crime, as recorded in the archives of the police courts. We have a perfect recollection of the statements prevalent at the time, to the effect that he acted in this matter as a mere spy and tool of the French police, who were desirous of obtaining evidence against M. Leymarie, the editor of *Le Revue Spirite*, and it was alleged that these officers of justice were not very particular as to the means by which such evidence was secured. Leymarie and Buguet stood in entirely different categories. The latter was a self-confessed impostor, the former was merely his dupe; and now that his incarceration has terminated Leymarie stands on the same footing among his friends that he previously did. For an answer to the query respecting the *present* state of spirit photography we must refer you to the *Spiritualist*, in which articles by Count Bullet and others on the subject have recently appeared.

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BROMIDE OF COPPER: ITS PREPARATION AND PECULIARITIES.

Of the various bromides which find a place in the laboratory of the photographic experimentalist the most recently introduced is the bromide of copper; and, as it presents certain features which seem to promise for it a more extended sphere of utility, and as it is, moreover, a rare and somewhat expensive salt, we have considered it worth while to say a few words upon its uses and economical preparation.

The principal practical use to which it has hitherto been applied is, as our readers will be aware, in the process of intensification recently made the subject of careful study, and fully described in our columns, by Captain Abney, and which we have had occasion to refer to more than once as a useful addition to the already numerous list of methods for obtaining density under exceptional circumstances. Mr. Warnerke has also spoken of cupric bromide in connection with the preparation of emulsions, and claims for it, when employed in that capacity, a special advantage in securing the impression of very feebly-illuminated details. In this direction, however, we have not yet heard much of its use—very possibly on account of the difficulty in obtaining the salt.

Its application to the purposes of intensification depends upon its property of attacking or bleaching the developed image by converting the metallic silver to the state of bromide—a property which it shares in common with its fellow haloid, the chloride. Its action, however, is different from that of the latter; for, whereas the application of a solution of silver nitrate to the bleached image produced by the bromide invariably results in a very remarkable increase of density, the same course of treatment following the bleaching with chloride produces little or no effect under ordinary circumstances. There is, however, a certain amount of resemblance between the two salts in general chemical properties; but the bromide appears to be a much less stable compound than the chloride, bearing a strong analogy in this respect to zinc bromide. Like chlorine, bromine forms two compounds with copper, one of which contains twice as much of the halogens as the other. In the case of the chlorine compounds their composition is pretty accurately known, and they are formulated as $Cu\ Cl_2$, $Cu_2\ Cl_2$ respectively. But the bromides have received comparatively little study; hence we are not so certain of their composition, though the formulæ Cu Br and Cu Br are usually accepted.

Those of our readers who have had occasion to use the better-known cupric chloride, which is obtained in pure crystals, will be aware that commercial samples are almost invariably contaminated with traces of the *cuprous* salt, as evidenced by the presence of a white insoluble sediment in the solution of the crystals. The same sediment is formed if the solution be left exposed to the atmosphere, and is due to the loss of a portion of the halogen and consequent reduction of the chloride to the state of sub-chloride, and ultimately, in all probability, by the hydrated oxide. To similar reactions we may trace the formation of the insoluble matter found in all samples of zinc bromide—at least in *all* samples we have seen; and there is every reason to believe, though from the nature of the salt it is more difficult of recognition, that the same or similar changes occur in cupric bromide. On account of this instability or uncertainty of composition it is, therefore, advisable in using bromide of copper to keep it in alcoholic solution (as is customary with the zinc salt), the strength or combining value of which is ascertained by actual experiment.

The simplest and best way of preparing cupric bromide is, no doubt, by the double decomposition of cupric sulphate and baric bromide, the insoluble baric sulphate being easily filtered out, leaving a solution of pure cupric bromide. But bromide of barium is a rather expensive salt, its cost being at least four or five times that of bromide of potassium at retail rates; therefore by adopting the method we propose the substitution of the latter salt forms equally as simple and as effective a plan as the other. The method described for the preparation of the bleaching solution for intensifying consists in mixing hot saturated aqueous solutions of sulphate of copper and bromide of potassium respectively. This forms a solution of bromide of copper, out of which, upon cooling, a large proportion of the sulphate of potash which results from the interchange of elements crystallises, and the portion which remains in solution produces no ill effect when the solution is used for the purpose in question. In order to utilise the cupric bromide for emulsion purposes it becomes necessary to free it from the remaining traces of a potash salt and also to drive off the water, and this entails an amount of trouble which many would be loth to incur.

If we substitute alcohol for water the insolubility of the two salts in that menstruum forms an obstacle, though by placing them together in a bottle with alcohol a slow and imperfect interchange of parts takes place. To bring about a perfect decomposition we have adopted the following plan:—Weigh out equivalent proportions of the two salts, or, rather, one equivalent of sulphate of copper to two of bromide of potassium; these will represent nearly equal actual weights, or, to be as nearly exact as possible, fifty parts of the first to forty-eight of the second. Reduce them separately to a fine powder, and when this is effected let them be mixed intimately in a glass mortar. The pulverisation of the sulphate of copper almost entirely removes its blue colour, and, when added to the bromide of potassium, the mixture is at first nearly pure white; but as the two powders are worked together with the pestle the colour rapidly changes to a dirty brown, and the whole gradually loses its powdery character and assumes the form of a soft, coherent mass. The latter effect is due to the liberation of the water of crystallisation of the cupric sulphate, which forms nearly one-fifth of the total weight of the mass, and by its presence enables the two salts to react upon one another rapidly and completely. The soft, brown magma must be rubbed down with the pestle until it assumes a smooth, even appearance, and presents no white specks of undecomposed material. This will occupy four or five minutes, after which it may be set aside in a warm place for some time to drive off as much as possible of the moisture. If artificial heat be resorted to the temperature should not be raised above 180° to 200°, as at this stage the cupric bromide seems to be peculiarly liable to decomposition, as is proved by the strong odour of liberated bromine experienced if the temperature be raised only as high as 212°.

The mass now consists of a mixture of sulphate of potash and bromide of copper, and very probably also sub-bromide; for the faint odour of bromine, which is easily detected, shows that at least a partial decomposition of the $Cu\ Br^2$ has taken place. If a high temperature be applied the odour of bromine is much more powerful, whence it may be assumed that heat favours this decomposition. The bromide of copper has now to be freed from the useless potash salt. This cannot be satisfactorily performed by the amateur by crystallisation from an aqueous solution, though a large proportion of the sulphate may be removed in this manner in consequence of its low degree of solubility; and even to only partially purify the bromide in this manner entails, as we have shown, a good deal of unnecessary trouble. If instead of water we employ alcohol, or even ether, the difficulties are entirely removed; for the sulphate of potash, being perfectly insoluble in these two menstrua, merely requires separating by decantation or filtration, leaving the bromide in solution. Further: this solution, after its strength has been ascertained by volumetric analysis, may be used by direct addition to the collodion, and thus all necessity for evaporation is obviated.

This purification is best performed by shaking up the mass of mixed salts in a bottle with a small quantity of alcohol or ether, just sufficient to cover it, and, after a few minutes' rest, decanting the liquid portion and replacing it with fresh alcohol or ether. By repeating this operation a few times the whole of the bromide is extracted, leaving the sulphate of potash as a dirty, granular sediment. We prefer the use of successive small quantities of the solvent to a direct addition of a larger quantity. As a farther safeguard againt impurity—though we do not suppose the presence of a small quantity of sulphate of potash would work any great harm—the solution may be passed through filtering paper, and is then stored away in a well-stoppered bottle.

If it be considered preferable to obtain the product in the solid state it is an easy matter to evaporate it to dryness, but it is impossible to crystallise it. We are, perhaps, incorrect in saying even that it may be evaporated to dryness, for a very lengthened application of heat fails to do this, as the substance appears to pass directly from the state of *solution* to that of *fusion* in the same manner as zinc chloride under similar circumstances; and it is only when the heat is removed and it is allowed to cool that it becomes solid. The evaporation is conveniently performed over a water bath, and we should recommend the operation to be carried out in close proximity to a fireplace with a good draught, otherwise the combined fumes of methyl (we have employed methylated solvents) and the disengaged bromine produce a painfully-irritating effect upon the eyes, and this is especially the case when ether is employed.

A very handy means of temporising a water bath consists in removing the inner boiler of a glue kettle and placing an evaporating dish over the mouth of the outer casing. It is almost needless to warn our readers that the light must be removed from below the kettle before commencing the evaporation, or an explosion will be almost inevitable, especially in the case of ether. If the water in the kettle be raised to the point of ebullition sufficient heat will remain after removing the light to carry on the evaporation with rapidity and regularity. When the whole of the solvents have been driven off, the residue will present the appearance of a dark brown or black incrustation on the sides of the dish—to all appearance quite dry; but, if a glass rod be plunged into it, it will be found that a sort of skin has formed on the surface, while the under portions are still liquid. Upon cooling, however, it solidifies into a dark-coloured cake, or slag, which changes to various shades of brown and brownish yellow when powdered.

A very noticeable peculiarity of this dark-coloured product is the variety of colour it presents under different circumstances. Dissolved in alcohol, ether, or collodion it colours the solution a peculiar yellowish tint of brown. Dissolved in a considerable quantity of water it forms a bright green solution; but in a minimum quantity the colour is again brown, but of an entirely different tint to the alcoholic solution. If the weak aqueous solution be gradually evaporated a point is reached at which it becomes brown while hot, but regains its green colour upon cooling. So remarkable is this change of colour that if a porcelain basin be rinsed out with a solution so weak as to scarcely leave any perceptible trace of colour, and placed over a Bunsen burner or other source of heat, as it dries it will assume a deep brownish-black colour, and this in turn gives place, when the basin is allowed to cool, to a delicate lemon-yellow. Similar phenomena are common to many of the copper and other salts, and are due to the hydration and dehydration of the substance; but the exhibition of both classes of colour in the presence of water we do not recollect to have met before. Some further peculiarities in the working properties of this preparation we must postpone for a future article.

THE PHOTOGRAPHIC EXHIBITION.

[Third Notice.]

As respects composition, the two views in North Wales (81-2), by Lieut. Darwin, R.E., are all that can be desired; but we think that a mistake has been made as regards the manner in which they have been printed. They appear to have been cemented upon the back surface of a plate of glass, so as to ensure optical contact between the glass and the surface of the print, the result being that they have a flat, sunk-in appearance which, under ordinary treatment, they would not have had. These remarks apply also to several of the pictures exhibited by the Military School of Engineering, Chatham.

Among a number of excellent landscapes exhibited by Mr. T. M. Brownrigg, we may direct attention to his picture, *On the Wey* (104), and *A Spring Evening on the Blackwater* (124), as ably keeping up the reputation of this able photographer.

The interiors of Mr. Fred. Downer (122) are highly-successful examples of this class of photographs. The *Farm Studies* and *Harvest Studies* of Mr. J. Foster (108 and 127) will prove very useful to artists. Mr. J. Milman Brown's picture, *Shanklin Old Village* (93), is a subject which will be recognised by all who have been so fortunate as to have visited this village. It is, however, rather inferior to other pictures by the same artist—for example, to his work, *A Country Road* (148).

The enlargements (111) by Mr. Henry Dixon are very excellent. Produced from negatives two inches in dimensions, or even less, the texture and detail of the enlargements are most admirably rendered.

Mr. C. Bennett contributes a large number of fine cabinet-size pictures. Of these the hanging committee have consigned to a position far too low for comfortable examination a frame of views of *Guernsey Rocks* (102), by the collodio-bromide process. Others, such as the frame 118, are now favourably situated for careful scrutiny. The frame mentioned contains twelve charming views, entitled *Bits from Bettwys.* Here we may observe that the lovely Welsh village, Bettwys-y-coed, has, in conjuction with its picturesque surroundings, furnished themes for a greater number of pictures in this than in any previous exhibition. Bettwys is indeed a lovely spot, and one which is, and may well be, the delight of every lover of nature who has been privileged to vist this romantic district. Dull, indeed, must be the soul of the photographer who, located even temporarily amid such scenery, does not there find room for expansion, or, to descend to commonplace, subjects almost innumerable for his camera. From the pictures of Mr. Bennett it can easily be recognised that this artist is a gentleman of refined tastes and also a skilful photographer.

A series of *Views on Loch Morah* (134), of dimensions nearly similar to those just mentioned, reveal the fact that Mr. W. J. A. Grant has brought home several interesting mementoes of a visit to the north. Two large pictures, by Mr. W. Vanner, *On the Windrush* (131) and *The Pollards* (132), are successful and pleasing works, and the same remarks will apply to two frames (151 and 152) of attractive pictures by Mr. William Wainwright, Jun., representing *Views on the Thames*.

A large collection of noteworthy photographs taken in Paris transport the sympathetic observer to the Great International Exhibition now open in that city. The twenty-three views of various interesting scenes in the World's Fair, selected by Mr. England for exhibition, have been executed with all that care and skill for the possession of which Mr. England has obtained a world-wide reputation. Those who, on visiting the French Exhibition, have had to hurry past numerous beautiful architectural and other details are here enabled to revisit such scenes once more, pictorially, and dwell at leisure on the structural peculiarities of each.

The exhibits of such an arduous scientific investigator and writer as Capt. Abney necessarily command attention. His various pictures are able illustrations of the peculiar features to be discerned in the skilful working of such processes as the washed emulsion, both plain and in combination with a beer and albumen preservative, and these developed with both alkaline pyro. and with ferrous oxalate. Pictures of this description possess educational value for the photographer; and for a similar reason we also welcome a frame of views in Kent and North Wales, by Mr. Edward Dunmore (94), obtained by plates that were prepared according to a variety of modes of manufacture, such as the Liverpool ordinary and extra-sensitive, Colonel Stuart Wortley's dry plates, and those of the Uranium Dry-Plate Company. As regards the pictorial merits of Mr. Dunmore's works, their artistic qualities are abundantly apparent.

Mr. A. Boucher exhibits largely. The various faces are so beautifully worked up by the popular appliances of the retoucher's art that it would be a positive relief if some photographic firm of eminence would exhibit a collection of works in connection with this branch of our art that were quite untouched. A number of portraits by Mr. John Lamb suffer by being hung too low to admit of their being easily examined.

The pictures of Mr. F. N. Broderick, Jun., respectively *The Coast at Ventnor* (138) and *Wreck of the Eurydice* (139), are highly interesting. The latter could scarcely fail to be so under any circumstances.

The famous poikilographs, exhibited by Signor Lombardi, arrest the attention of those who pass upstairs on the way to the gallery. These have necessarily been relegated to the staircase, as it is one of the rules of the Exhibition that no coloured photographs are admitted inside the gallery. The pictures in question are, with one exception, reproductions in *facsimile* of paintings in the Dresden Gallery, and they arrest attention by their fine finish and apparent elaboration. We say "apparent," for it is now well known that these imposing pictures are merely photographs which have been rendered translucent and the pigments then applied to the back of the picture, the photograph itself supplying the drawing, detail, and lights and shadows. The appearance is that of a most carefully-executed painting in oil, and the effect is singularly excellent. One of the pictures is an ordinary photographic enlargement finished and coloured in the manner indicated, and its effect is exceedingly good.

We must postpone further critical notice of the present display till next week.

STOPPING-OUT BACKGROUNDS.

We left our subject last week after treating of opaque pigments as light obstructors; but it will be evident that many cases may arise in which the sole employment of such a method would entail loss of time and waste of material. Thus, when a very large space has to be entirely stopped out for temporary purposes, we should never cover the whole space with the pigment, as it will be found that a margin of half-an-inch painted on all round any object will prevent the light "printing under" if a brown-paper mask be placed on the back of the negative, and cut within a trifling distance of the contour of the object to be printed with its white margin.

Then, again, a combination of the two will often be useful in the case of a subject containing both broken curves and straight lines; for it is our experience and that of others that the painting of an absolutely straight line of several inches in length requires not merely a steady hand but an amount of skill that frequent practice alone can give. We first had our attention called to this in seeing some clever views of locomotive engines which had been taken for the manufacturer's purposes, and had consequently the background stopped out. They were perfect in execution, and, indeed, were some of the most effective examples of the usefulness of photography we ever saw. A few of them were not so clean-looking as regarded the outline of the boilers, and upon pointing it out we were informed that these few were entirely painted out by hand, while the others had the minuter details painted out, and the longer straight lines, such as those bounding the boiler, stopped out by a paper mask. This mask (placed, of course, on the film side) was, where possible, one solid piece, cut out in the necessary parts—not by scissors, but by a sharp penknife; but not infrequently it was found difficult to mask in that manner, and then strips of blackened sensitised paper were cut out with perfectly clean edges and cemented in their place.

Where masks, large or small, or any temporary obstructions have to be attached to the varnished side of a negative we have found that nothing surpasses a solution of india-rubber. It secures the mask most completely, sticking very pertinaciously and not cockling it at the point where it is smeared on, and, finally, permitting its easy removal if not allowed to remain on too long. If gum be employed it cockles the mask, and will prevent a large one ever registering true to the negative from which it is printed. Spirit varnish does not adhere firmly without trouble; paste is like gum, and both have a tendency to pull away portions of the film.

Where the use of a large paper mask to the almost entire exclusion of painting out is determined on it is usual to print a deep impression on plain paper. It will, however, be found a most difficult matter to fix it in its place after cutting, some portions refusing in the most provoking manner to cover the required space, though the whole of the other part of the paper may lie exactly over those parts of the negative through which they were printed. The inexperienced hand will be apt to think that this is caused by inexact cutting out. It is not so, however; it is mainly caused by a straining of the fibres of the paper during the cutting, so that the various portions are put "out of square." The effect is mostly produced when scissors are employed in the cutting, and hence those photographers who do a class of work requiring many of these masks almost universally employ a sharp-pointed penknife, cutting against a piece of zinc or cardboard.

One of the best methods of doing this is to print (on salted paper, albumenised paper cockling and twisting too much) of such a depth that every detail shows most plainly. Then before taking the print out of the frame a narrow edging of the caoutchouc solution is run round the top of the background, and the print pressed to and allowed to remain in the frame for a few minutes; the negative with the attached print is then taken out, and put aside for a few minutes to harden the cement, when it is ready for cutting the mask. To do this a piece of zinc or cardboard is put a short distance upon the edge of the negative with its attached mask; the latter is then turned over towards the operator, and sharply doubled down upon the zinc, &c., thus leaving the print to view. Everything that is required is then cut out with the knife, and when this is done it will be found upon turning the print back again in its place that, if it have not been pulled and fingered, it will be perfectly in register over every part of the negative.

We have dwelt at length upon this subject, as we have reason to believe that the photographing of such objects as we have named is a lucrative branch of photography, but one which, from its comparative infrequency, is found to present sundry difficulties to those who have not been trained to it.

It will be obvious that when pure landscapes are in question such a mode of masking is not to be tolerated for a moment. It would be impossible to prevent that most vicious of effects—a hard outline; and when a distant horizon was depicted it would simply ruin a picture. For landscapes, and all classes of pictures where the separation of parts at the masked edge would be at all prominent—such, for instance, as the junction of sky and earth—the masking must be most gentle and graduated. Fortunately, it generally happens that, as the sky of itself never comes out very dark in a picture, other dangers and difficulties are reduced to a minimum. All that is necessary, as a rule, is to cut a piece of brown paper roughly to shape, and move it a little during the printing (a cut-out silver print may be used, if preferred, of course on the back of the negative). When the clouds are to be printed in a similar method may be used to stop out the print, though this branch of the subject belongs more especially to the domain of double printing, of which it is not our intention now to treat.

RECENT PATENTS.

No. XVII.—MRS. DALE'S METHOD OF COLOURING PHOTOGRAPHS.

To produce the most effective picture by the minimum expenditure of time and skill is one of the problems which every photographer desires to be solved in his own professional practice. To what extent the invention of Mrs. Robert Dale aids in securing such a desirable consummation every intelligent reader will readily perceive from a perusal of her specification, which, having received provisional protection only, is now thrown open to the public:—

Inasmuch that heretofore coloured photographs have been produced either by the direct application of paint to the surface of the photograph, or by rendering by means of varnish, gelatine, siccative, or paraffine (all of which are liable to crack, discolour, or evaporate) the photograph transparent, and by then affixing the same face downwards on the glass, painting the back thereof.

According to the present invention coloured photographs of a more permanent nature are produced in a simpler and more effective manner, and at a cost much less than has heretofore been the case.

The process consists in mounting an ordinary paper photograph, which should be clearly photographed and rather darkly printed, face downwards, on a convex glass by means of a warm solution of starch or other adhesives of a gelatinous nature, and, after drying, laying the same in a bath of pure castor or linseed oil until the same has become perfectly transparent. The finer parts of the photograph are then painted on the back with pure oil colours without medium or varnish, the photograph supplying light and shade, and the colour showing through. A second convex glass is then placed over the back of the painted photograph, and on the back of this second glass is painted all the layer and heavier masses of colour necessary to render the photograph, when viewed from the front, a complete painting, combining an apparent delicacy of manipulation with a depth of tone and roundness of form not attainable by any other process. The glasses are then carefully closed at the edges by means of fusion, or the application of an impervious substance to the prevention of evaporation and the exclusion of air. A white or tinted card is then affixed to the back of the second glass, when the whole presents the appearance of a painting on porcelain.

It is necessary to mention that, in the case of photographs of still life, flat glasses are sometimes preferable to convex ones.

The advantages of this invention are simplicity in working, smaller cost of production, and greater permanency than has hitherto been attained by any other process.

From the foregoing specification it will be seen that excellent effects in colour may be obtained by adhering to the directions given. On the *novelty* of the invention we are not called to speak, seeing that there is now no restriction whatever upon its use.

No. XVIII.—VANDERWEYDE'S METHOD OF ILLUMINATING OBJECTS TO BE PHOTOGRAPHED.

It is one of the conditions upon which a patent is granted that within a period of six months from the date of application a complete specification shall have been filed. This Mr. Vanderweyde, from some cause or other to us unknown, has neglected to do; hence the public have now the full benefit of such invention as is set forth in the following specification, which is the provisional one, and which has been declared "void" for the reason just given.

The title of the invention is "An Improvement in Illuminating Objects to be Photographed, and the Interior of Public and other Buildings," and the specification is as follows:—

My invention relates to an improvement in illuminating the subject to be photographed, and the interior of buildings, by the electric or other powerful artificial light, and consists in an improved arrangement whereby the rays diverging from the source of light are collected into a parallel or converging beam of light, as required for the purpose of photography, without the aid of a lens as heretofore used, and the illumination is wholly or almost entirely obtained by reflected light, the direct rays from the source of light being completely or for the most part intercepted.

My invention consists in the employment in combination with the electric or other artificial light of a parabolic or other concave reflector of comparatively large size, in the focus of which the light is placed, and a shield or screen of opaque or semi-translucent material placed on the opposite side of the light to the reflector.

The shield or screen is made as small and placed as close to the light as possible, in order to intercept as little as possible of the reflected light, and the interior surface may be polished, and of flat, concave, or other form best adapted to reflect the rays of light which it intercepts towards the reflector.

In illuminating public buildings the reflector would be formed by the dome-shaped ceiling or roof, or by hangings of light-coloured blinds or curtains arranged in a convex form, the light being placed in the focus of the reflector, and the direct rays intercepted by a screen, as before described.

This system of illumination is not new, but it is the correct one. The effect is similar to that obtained when the sitter is illuminated by means of a white cloud, of which this is merely an artificial form.

No. XIX.—PRAGER'S METHOD OF TRANSFORMING PAPER PHOTOGRAPHS INTO OIL PAINTINGS UPON CANVAS, WOOD, &c.

This patent has been obtained by Mr. Adolf Prager, of Berlin, and relates to a new or improved process for transforming or converting photographs into oil paintings upon canvas, wood, metal, or any other suitable material. The patentee says:—

The albuminous coat which covers the photographic paper upon which the photographic image is received is detached from the paper, and represents a fine or thin pellicle or transparent skin, upon which is the photographic image.

This albuminous skin or pellicle being wet, is transferred to a glass table, and when it is dry I apply upon it the oil colours upon the image on the inverse side—that is to say, upon the side which was adherent to the paper.

In all the colours employed in my process I mix about one-tenth of tears of mastic finely powdered.

When the albuminous pellicle or skin has been painted as above described, and is completely dried, it is then transferred on to an ordinary picture canvas, or on to a wood panel, or on to a metallic plate which has been previously varnished with mastic varnish, and which varnish has been allowed to dry completely beforehand.

The canvas, the wood panel, or metallic plate, having the albuminous painted pellicle thereon, is placed between two metallic plates moderately heated and pressed in a powerful press until the two metallic plates have become cold.

I take the plates from the press, and the photographic image prepared by this process represents a perfect miniature upon canvas, wood, or metal, with which the thin albuminous coat forms the body by hot pressure. The colours being placed under the albuminous pellicle, are consequently not in contact with the atmosphere, and, being fixed by hot pressure, these miniatures are preserved for an indefinite time.

Having thus described the nature of my invention, and the manner of performing or carrying the same into practice, I would have it understood that I do not limit myself to the exact details hereinbefore described, so long as the main features of my invention are retained, neither do I claim any part of the process or appliances separately, previously well known, and in common use; but what I claim is the new or improved process or processes combined for converting, transforming, or transferring photographic pictures or images on paper into oil paintings upon canvas, wood, metal, or other suitable material, substantially in the manner hereinbefore fully described.

The process here described is merely a modification of that now well-known method of colouring a translucent or transparent photograph on the back and then pasting it down upon canvas or other support. The difficulties of the "patent" process greatly exceed those of the common method.

Dr. Nicol has made a valuable suggestion in his article last week in proposing a new method of preventing the defect known as "blurring." No one who has ever worked the old plan of backing the plate will be inclined to say much in its favour, beyond admitting that it is the only practical preventive at present known which does not act injuriously upon the sensitiveness of the film or the quality of the result. The use of coloured glass and some other devices no doubt prove effective in their action, and do not affect the photographic properties of the film; but they fail owing to being practically unsuitable to the requirements of dry-plate work. Colouring the film by various means has been proposed; but this, while doubtless perfectly effective in arresting as far as it is possible to do the tendency to blurring, gives rise to insensitiveness and irregularity, and has therefore secured no very great amount of recognition. Such being the facts it is not surprising that attention should be directed to the substratum, with the view of interposing a non-actinic film *between* the collodion and the glass. Such a proposal was indeed made some years ago; but Dr. Nicol is the first, we believe, who has come forward with a detailed and practical suggestion. It seems strange, however, that he should have selected the one of all the various substrata in common use which apparently presents the smallest chance of utility; for benzole as a solvent is far more limited in its application than water, alcohol, or ether. The two last are, of course, placed out of the competition where the object is to secure a coloured film which shall not be acted on or dissolved by the collodion; but why reject the first, which is *the* solvent *par excellence?* Albumen Dr. Nicol rejects as useless for the main purpose of a substratum—to cause the collodion to adhere to the glass—and justly, we think, now that alkaline development is so general; but gelatine, which is rapidly coming into favour, offers equal facilities as a vehicle for colouring matters soluble in water. So long as the colouring matter is insoluble in ether and alcohol there seems to be little danger of the collodion attacking it to any appreciable extent, and the only difficulties are in the selection of a substance answering to the necessary conditions and capable of easy removal when its function is complete. As a further suggestion in the direction of the choice of a suitable pigment we venture to ask is it necessary that it be soluble? We think that a sort of emulsion of some semi-opaque material would answer the purpose quite as well by intercepting the rays of light in their passage to and from the back surface of the glass. It would not interfere with the textural quality of the sensitive film, and many substances may be chosen which are soluble in either hypo. or some other easily-applied reagent, so that no difficulty need be experienced in their ultimate removal. The only objection likely to present itself lies in the thinness of the substratum and of the solution used in its formation; the latter condition would possibly operate against the production of a sufficiently dense film by its inability to hold a due quantity of the insoluble matter in suspension. It would be interesting to try the efficacy of a gelatine substratum containing *insensitive* iodide of silver. This should not only play the part of an interceptor of the light rays, but also aid in the production of a dense image.

PRACTICAL INSTRUCTIONS IN MODERN PHOTO-MECHANICAL PRINTING METHODS.

Part I.—PHOTOLITHOGRAPHY.

IV. Transferring the Fatty Image to a Lithographic Stone.—The transfer having been made, our subsequent operations are independent of daylight, as the photographic part of our operations is completed, and we have next to study and to practise the lithographic portion of the work.

There is no disguising the fact that, unless the student is prepared to be beaten and to be stopped short after a few experiments, he must set to work in good earnest and acquire a considerable practical knowledge of most of the operations incidental to lithographic printing. Not only this, but he must also carefully study the principal sources of failure, and to some extent compensate for his want of extensive experience by minute observation and thoughtful consideration. In all this his previous photographic training will aid him considerably, as in many respects there are points of analogy between the behaviour of a negative plate and that of the lithographic stone.

It is too much the practice, in treating of photolithography, to consider that the subject is practically exhausted as soon as the transfer is made; and the student is then recommended to seek the help of some practical lithographic printer, who will in a few minutes teach him all that it is now requisite for him to learn. Here lies, in all probability, the reason why so few photographers have carried out photolithography commercially, and added this process to the ordinary working operations of the studio and of the printing-room. The photographer makes his transfer successfully, thinks all difficulties are over, goes in rather an elated spirit to the nearest lithographic printer, and then difficulties commence. Perhaps the lithographer applied to has only been accustomed to a few branches of his business, and is as unprepared for difficulties incidental to the treatment of a photolithographic subject as many itinerant photographers would be if required to work the collodio-albumen process, or to make carbon transparencies. It is, in fact, in the lithographic part of the work in which photographers require special instruction; and in this branch of the subject they are most likely to meet with apparently incomprehensible failures, from which lithographic operations are by no means free. But the patient labours of such men as Engelmann, Hullmandel, Knecht, Lemercier, and of the immortal Senefelder, the discoverer of lithography, have placed the student of today in a position to meet these difficulties as they arise.

The first work of the beginner is to select some lithographic stones. Very much depends on the quality of these, and on their suitability for the kind of work which he intends to do; as an unsuitable stone, or one improperly prepared, will be a continual drag on the student's progress, and may even cause him to abandon further experiments in photolithography. In commencing lithography it is well to have nothing to do with second-hand lithographic stones, unless, indeed, they are to be made use of as inking slabs. A second-hand stone may be so saturated with gum on the one hand, or with fatty matters on the other, as to lead the novice into great difficulties. The presence of gum on the stone would render the adhesion of the fatty transfer imperfect; and the presence of fatty matter would give the stone a tendency to tint under the action of the inking roller. Either of these faults can only be remedied by a laborious grinding away of the surface of the stone until the entire removal of the contaminated portion has been effected.

Having entered a lithographic material warehouse the beginner ought to inquire where the Bavarian stones are kept, and he should then proceed to examine them very leisurely. Those which possess an uniform grey or buff tint, and on which no spots, veins, or markings can be detected, are most likely to repay the trouble of a further examination. A moist sponge should now be passed lightly over the face of each selected stone, provided, of course, that this useful article can either be smuggled into the warehouse or be borrowed there; and notice should be taken as to the rapidity with which the film of moisture sinks into the various stones. Those stones which absorb the water almost immediately are most suitable for the general run of work; but it is quite possible to have a stone inconveniently porous, while those stones which absorb the film of water with considerable slowness are unsuitable for the class of work which is at present under consideration. The most important point, however, is to select stones which are uniform in porosity all over the surface, as evidenced by an equal absorption of the film of water. When some parts of a stone absorb water readily, while other parts absorb it slowly, that stone is fit for no other purpose than for use as an inking slab, and it is not very good for that purpose unless its surface has been saturated with boiled linseed oil, and a sufficient time has been allowed for the oil to become indurated. The precaution of moistening the surface of each stone before finally selecting it should never be neglected when it is practicable to apply this test, as the moistened surface of the stone often shows defects which would otherwise escape observation. Some stones contain whitish, chalky spots which are much softer than the rest of the stone, and the presence of these spots constitutes a very serious defect. As these soft places often lie in strata parallel with the face of the stone, they sometimes do not show on the surface until the stone has been in work for some time; but a careful examination of the edge of the stone will often reveal their presence when they so exist. Iron stains, especially in the case of hard stones, are often unaccompanied by any want of uniformity as regards porosity; but it is best to avoid stones so marked, as these markings are liable to deceive one with regard to the relative intensity of the various parts of any subject which may be transferred to the stone. Exceedingly fine black lines like hairs are generally harmless, unless accompanied by an incipient fissure, and it very often happens that the best stones are so marked. Those stones which are composed of several strata, as seen by examining the sides, should be rejected, even when the face of the stone only cuts into one of these layers, as the repeated grinding of the stone will ultimately so far diminish its thickness as to bring the face down to the fresh layers. Care should be taken to select stones having both faces approximately parallel, as if the thickness of a stone be not uniform a considerable amount of time and labour has often to be expended in packing it up when on the press. The beginner will do well to select all his stones of an uniform size—say twelve inches by ten—as in grinding it is convenient to work the faces of similar stones together.

Lithographic stones, as usually supplied by the dealers, are only roughly dressed, and the first operation is to prepare the surface so as to fit the stone for work. Having placed one of the stones on a board placed in the sink, its surface should be flooded with water, and a little pit sand that has been passed through a sieve having twenty meshes to the linear inch must be sprinkled on it. The grinding operation is now commenced by placing a second and similar stone face downwards on the sanded surface, and then moving the top stone about in all directions on the lower one. By slightly pressing with the fingers on one corner of the upper stone a sufficient grip can be obtained to enable the operator to cause it to rotate on its vertical axis, and a little practice on the part of the operator will enable him to manage that the rotating axis shall so travel about on the lower stone as to describe lines parallel with its sides. In this way the upper stone is made not only to revolve on its axis, but also to travel round the centre of the lower stone at the same time. This operation must be varied by driving the top stone from each corner in succession, so as to equalise the grinding action as much as possible. After this, diagonally-opposite corners of the top stone are held, and a to-and-fro motion is communicated to it, the direction of this motion being continually changed, the hands being also occasionally shifted to the alternate angles of the upper stone. The more the upper stone overtops the lower one during the grinding so much greater will be the tendency of the top stone to become concave on the face, and of the bottom one to become convex; and it is well to counteract this tendency by occasionally changing the two stones, one against the other. During the whole of this grinding operation it will frequently be necessary to wash away the whitish mud which results from the grinding, and to charge the lower stone with a fresh supply of sand and water. When the surface of neither stone presents any scratches or indentations deeper than those caused by the sand the first surfacing is complete.

The stones are now very carefully freed from every trace of the coarse sand by a thorough rinsing, and the surfacing operation is repeated with fine graining sand which has been passed through a sieve having a hundred and twenty or a hundred and sixty meshes to a linear inch. In order to obtain the best surface which this fine sand is capable of giving it is advisable to move the upper stone in very small circles, and to avoid any movement in straight lines. As the grinding action of the fine sand is not great it is allowable to employ a small piece of lithographic stone or a zinc muller in the place of the upper stone. When the fine sand has smoothed the stone uniformly all over—and this is best ascertained by allowing the stone to dry—it must be carefully rinsed, and then polished with pumice-stone. A piece of pumice which is close in the grain, free from any large hollow places, and not unduly dense, should be selected, and a flat face must be worked up on it by friction against some *non-gritty* surface, such as the side or back of a lithographic stone. Having placed the lithographic stone on a table, and provided a basin of water near at hand, the pumice is dipped in the water and then worked backwards and forwards on the face of the stone until an uniformly-polished surface is produced. Every now and then it is necessary to dip the pumice into the water, in order to remove the mud, which tends to clog it. The stone having next been rinsed with water is wiped on the face with a glass cloth or piece of diaper perfectly free from any trace of fatty, saponaceous, or mucilaginous matter. This cloth should, in the first instance, be very carefully cleaned by boiling in weak soda solution, after which it should be thoroughly rinsed in clean water and dried. As much depends on the freedom of this cloth from traces of fatty matters, and more especially on its perfect freedom from anything of a gummy nature, it ought to be kept in a box or drawer by itself, and it should be locked up if careless people are likely to gain access to it.

The stone, being now dry, is placed on the bed of the press, and its surface is covered by several thicknesses of paper, care being taken that the sheet which is immediately next to the stone is perfectly clean. The pressure is now adjusted so as to give a moderate and uniform pinch on the stone. The uniformity of the pressure may be ascertained by placing a few narrow strips of paper between the sheets of paper which cover the stone and carefully examining the traces left by these strips when the carriage is passed through the press. When an uniform pressure cannot be produced by a proper adjustment of the roller or scraper of the press, it becomes necessary to pack up the stone by means of thick paper placed under those parts where the pressure is deficient; but this packing should be so graduated in thickness as to leave no part of the stone unsupported, otherwise a fracture might easily occur. Before proceeding farther it is well to see that all parts of the press work freely, that the leather tympan is tight, and that the carriage rides steadily under the roller or scraper. In the case of a scraper press see that the leather is well lubricated with a mixture of blacklead and tallow; but at the same time take care that all parts of the press which do not require lubricating are quite free from grease.

Let us now suppose that all adjustments of the press are made, and that the stone and the bed of the press are so marked that the same position of things can easily be re-established. The next thing is to see that the transfer is ready to hand and that it possesses the right degree of moisture. This may be adjusted either by the application of a damp sponge to its back on the one hand, or by fanning with a piece of cardboard on the other. The stone is now removed from the press and some pints of boiling water are poured over its face; after which it is drained for an instant and its prepared surface is quickly wiped with the especially clean cloth. The dry and slightly warm stone being now laid in its old position on the bed of the press, the damp transfer is laid face downwards in the required position, and it is covered by the sheets of paper which were employed to lay over the stone when the pressure was adjusted. The tympan being now shut down, and the carriage passed through the press with a steady movement, the transfer becomes adherent to the stone. The backing-paper is next shifted or turned round and another pressure is applied; and this shifting of the backing-paper and renewed application of pressure may be repeated five or six times, while it is well to add an extra sheet of paper to the backing before each renewed pressure, so as to gradually increase the pinch on the stone. It is also well to turn the stone round occasionally during the operation of transferring, in order to ensure a complete transference of the image; and a moist sponge may advantageously be passed over the back of the transfer, every now and then, not only with the view of replacing the moisture absorbed by the backing-paper, but also with the object of slightly increasing the dampness of the transfer as the operation progresses.

A sufficient number of pressures having been given the stone is removed to the sink, and the back of the transfer is sponged with water until it is so far softened as to render easy the stripping it off the stone. The transferred image should then appear clearly and sharply-defined on the stone, while the paper just removed should be almost entirely denuded of the fatty ink. The stone is now to be flooded with tepid water, and at the same time it must be rubbed with a broad camel's-hair brush, in order to remove any trace of gelatine which may be adherent to the surface of the stone. It is as well to spend a sufficient time over this operation, as any trace of gelatine remaining would not only tend to prevent the adhesion of any writing or retouching which may be put on the stone at this stage, but it would also hinder the penetration of the gum, and so render the whites liable to tint during the printing. The stone, being freed from all traces of gelatine and well rinsed with water, is now set up to dry, after which it is ready to receive any additions in the shape of border lines, title, and soforth. If any of the coarse lines of the transfer are defective they may be retouched at this stage; but the working up of any fine lines which may be defective had better be performed by a method to be described further on.

These additions and corrections are made by means of lithographic writing ink, which is sold in the solid state, and must be rubbed up with water when required for use. One end of the stick of ink is to be worked in a very few drops of water contained in a slightly-warm saucer until the water has dissolved sufficient ink to give it a consistency about equal to that of ordinary copying-ink. A few drops more water are now added and the rubbing up of the ink is resumed, this series of operations being continued until a sufficient quantity of the liquid ink has been obtained to half fill a small thimble, which instrument, if mounted in a small block of wood, makes an admirable inkstand. The special care required in rubbing up the writing ink arises from the fact that a large excess of water curdles and decomposes the ink, rendering it lumpy and unfit for use. The operation of writing on the stone is best performed with a fine pen of the kind usually sold for the purpose; and it is scarcely necessary to remark that the writing must be reversed in order that it may print correctly. If preferred, the titles may be written or printed on lithographic transfer paper, and the transfer thus obtained is then transferred to the stone just in the same way as the photographic transfer was put down on the stone. Border lines are best made with the ordinary ruling pen employed by draughtsmen, and any erasures may be readily made by scraping away the defective lines with a sharp penknife. During all these operations on the dry stone the greatest care must be taken to avoid its coming into contact with any greasy substance, and the prepared face of the stone should not be touched by the fingers or hand.

The image and additions being now fairly on the stone, and the writing-ink being dry, the next operation is to brush over the whole surface of the stone with a thick mucilage of gum, and then to place the stone aside until the gum is dry and the stone shall have become quite cold, if, indeed, any warmth remain after such a series of operations.

The subsequent treatment of the stone and the management of the inking-rollers will form the subject of the next chapter.

T. Bolas, F.C.S.

A NEW STUDIO.

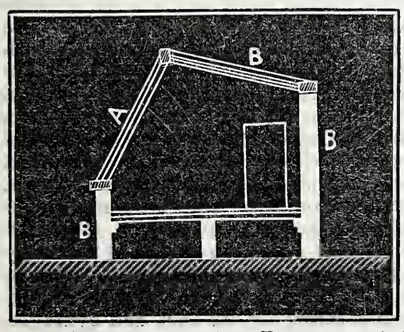
The columns of The British Journal of Photography for the 16th November, 1877, contained an account of the destruction of my studio (only erected two years previously) and business premises at Surbiton by fire. So complete was the loss that, with a very small exception, not an instrument, negative, or article of furniture of any description was saved, and nothing but a smoking pile of wet ashes remained. After a short period of confusion the business of settling with the fire insurance office was entered on, and occupied three months. It was impossible to make temporary arrangements for business, being winter time; thus the thread of every transaction was cut, and had to be recommenced afterwards.

It was determined, as the entire block of buildings was down, to rebuild on a much larger scale, and with every possible advantage in the lighting of the studio, &c. The following are a few of the considerations which guided me in designing a studio:—1. It must have the most rapid possible light without glare, and sufficient length to take large groups; also to permit the use of large lenses for small pictures. 2. No blinds must be required. 3. The situation ought to be such that the afternoon light should not be a slow one. A reference to the sectional sketch will show what I ultimately determined upon, and I have never regretted for a moment a single one of the dispositions made.

It is my belief that the studio is the most rapid that has ever been built, and by the most simple head and body screens the need for blinds is entirely obviated. The length of the studio (fifty feet) permits of making, practically, two rooms of it; and as the backgrounds are strained on frames and attached to movable stands on castors they can be wheeled about or turned to any angle in a moment. Shadow effects are obtained without the sitter moving from a central seat, and the camera can be wheeled round, and the background too, until the desired effect is seen.

The camera is covered by a light movable canopy lined with black, under which the operator stands, and by which the light can be effectually cut off from the lens.

The great feature of the studio is the arrangement by which the sashes, starting from two feet from the floor, slope inwards at an angle of 60° until a height of twelve feet six inches is reached, as in the annexed diagram. A is the glass, whilst all the B parts are



opaque. The part of the roof marked B is painted, inside, of a cool bluish, French grey, and, from the angle at which the light reaches it, reflects downwards a gentle actinic light of great value. The glass is continued right to the end of the studio.

I am aware that "it has been said by them of old time" that a space of five or six feet dark should be left at each end of the studio. I carefully went into this question and determined to carry the glass right to the end, for if it turned out wrong it could easily be stopped out. The light is very valuable from the end, and I recognise it as an advance.

It was objected very strongly by some competent judges who saw my plans before commencing that a great disadvantage would be found in the sloping main light, from being unable to get the sitter near enough to the light owing to want of headway. This is not so, as a six-foot person can stand at the side of the glass without touching it.

A very important matter on which I determined to make a decided change from the ordinary practice was in backgrounds. With a few exceptions I had hitherto had the usual rolling arrangement, with backgrounds fixed on brackets above. I have them now all strained on frames—one on each side of the frame. These fit against stands on castors, and they can thus be wheeled in any direction to suit varying lights or to introduce any desired part of the background.

Very little in the way of costly furniture, curtains, or similar accessories have been procured. Providentially the public taste has been directed in other and far more pleasing ways.

Samuel Fry.

PARIS INTERNATIONAL EXHIBITION, 1878.

COMPLETE LIST.

Class XII.—Photography.

Hors du Concours.

M. Davanne, Juror for France, President.
,, Luckhardt, Juror for Austria, Secretary.
,, England, Juror for Great Britain.
,, Frank de Villecholles, Supplementary Juror for France.
,, Alfred Chardon, Expert for Photo-engraving.

Decorations of the Legion of Honour.—M. Davanne, President of the Council of the French Photographic Society, Paris, for distinguished labours for many years in the advancement of the art and science of photography, author of several works on photography—*Chevalier*; M. Rousselon, director of the photographic establishment of Messrs. Goupil and Co., Asnières, France, remarkable for his splendid exhibition of photo-engravings—*Chevalier*; M. Dujardin, photo-engraving—*Chevalier*.

Grand Prizes.

Diplomas of Honour.—Direction General of Government Works of Geography (Photographic Section), Portugal; Imperial Fabrication of Paper for the State, Russia; French Society of Photography, France; Photographic Society of Vienna, Austria.

Collaborator—Grand Medal.—A. Poitevin, specially recommended to the Minister of Commerce by (1) the Imperial Fabrication of Paper for the State at St. Petersburg; (2) by the French Society of Photography at Paris, France; (3) by the Photographic Society of Vienna, Austria; (exceptional prize) France.

Diplomas of Gold Medals.—Janssen (member of the Institut), presented (1) by the Minister of Public Instruction, (2) by the French Society of Photography, France; Rodriguez, J. J. (Section Photographic of the General Direction of the National Works of Geodesy, Topography, Hydrography, and Geology, of Portugal.)

Diplomas of Silver Medals.—Scamoni, for the perfection of his heliographic plates and of different processes employed for photographic impressions in printing inks, Russia; Pinard Frères, photographers of the School of Medicine at Nantes, Ministry of Public Instruction, France; Capello, Director of the Observatory of the Enfant Don Luis de Portugal, Portugal; Lombard, chief of the photographic service at the Prefecture of Police, Paris, France.

Diplomas of Bronze Medals.—Bouche, *attaché* to the photographic service of the Prefecture of Police, Paris, France; Collard, photographer, of the city of Paris, Council Municipal, France; Emonds, photographer, of the city of Paris, Council Municipal, France; Gelbke, co-operator with M. Luckhardt, with eleven years of service, Vienna, Austria; Lissonde, *attaché* to the photographic service of the Prefect of Police at Paris, France; Marville, photographer to the City of Paris, Council Municipal, France; Merlet (Tony), co-operator with M. Walery, Comte d'Ostrorog, Paris, France; Rafray, missionary of the Ministry of Public Instruction, France; Schmidt (Otto), co-operator with the Maison Czihah, Vienna, Austria; Zotmann, co-operator with M. V. Angerer, Vienna, Austria.

Recall of Gold Medal awarded in 1867 *and again in* 1878.—Lafon de Camarsac, France.

Gold Medals.—Angerer, Austria; Bergamasco, Russia; Bechard, Egypt; Braun, France; Brusa, Italy; Cheri-Rousseau, France; Dallmeyer, England; Dujardin, France; Garnier, France; Gillot, France; Goupil and Co., France; Vernon Heath, England; Joliot, France; Karéline, Russia; Koller, Hungary; Levy and Co., France; Lumiere, France; Matheiu-Deroche, France; Mieczkowski, Russia; Nadar, France; Perlmutter, Austria; Quinsac, France; H. P. Robinson, England; Carlos Relvas, Portugal; Ross and Co., England; Sarony, United States; Sebastianutti, Austria; Leon Vidal, France; Victoire, France; Comte Ostrorog Walery, France.

Recall of Silver Medals awarded in 1867 *and again in* 1878.—Baldi and Würthle, Austria; Baldus, France; Berthier Paul, France; Darlot, France; Jeanrenaud, France; Negré, France; Reutliuger, France.

Silver Medals.—Allessandri Fratelli, Italy; Alinari Fratelli, Italy; Alviach, Spain; Ambrosetti, Italy; Arosa, France; Audra, France; Autotype Company, England; Bacard Fils, France; Balogny, France; William Bedford, England; Beernaert Freres, Belgium; Berthaud, France; Blaise and Rochas, France; Boissonnas, Switzerland; Brandel, Russia; Carette (Lille), France; Chambay, France; Chaumaux, Switzerland; Centennial Photographic Co., United States; Chaulnes (Duc de), France; Chute and Brooks, Uruguay; Dagron, France; Delton Photo. Hippique, France; Derogy, France; Deroux, France;

Duboscq, France; Ducos du Hauron, France; Elliott and Fry, England; Faulkner and Co., England; Fernique, France; Fleury Hermagis, France; Flormann, Sweden; Francais, France; Adelbert Franz, Austria; Garcin, Switzerland; Gernzet Freres, Belgium; Gugenheim and Forest, France; Gutekunst, United States; Henderson (Montreal), Canada; Holterman, N. S. Wales; Jaffé, Austria; Jocger, Sweden; Payne Jennings, England; Jonte, France; Klösz, Hungary; Kostka and Mulert, Russia; Kozmata, Hungary; Lochenal and Favre, France; Landy, United States; Laurent, Spain; Lawton, United States; Lacadre, France; Lemercier, France; A. Liébert, France; Linck, Switzerland; Löwy, Austria; Mieusement, France; Moräes, Portugal; Mulnier, France; Neurdein, France; Notman and Sandham, Canada; Penabert, France; Prazmowski, France; Provost, Pere and Fils, France; Puech, France; Achille Quinet, France; Ravet, France; Comte de Roydeville, France; Rupprecht, Hungary; Sebah, Egypt; Stillfried, Austria; Slingsby, England; Smith, United States; Szekely, Austria; Taeschler Freres, Switzerland; Tourtin and Co. (Emile), France; Turner and Henderson, Canada; Ultzmann, Austro-Hungary; Warnerke, England; Winter, Austria; Yves and Barret, France.

Bronze Medals.—Almagro, Spain; Alophe, France; Franz Antoine, Austria; Angiolini and Tuminello, Italy; Appert, France; Arenas; Spain; Asser, Holland; Bardoux, England; Beil, Portugal; Boggio. Italy; Bonfils, France; Dr. Borsos and Varsagh, Hungary; Boucher, England; Brownrigg, England; Bude, Austria; Carjat, France; Cayrol, France; Chamoin, France; Charconnet and Lavergne, France-Chauvigné, France; Christiano, C. Argentine; Cognacy, France; Collard, France; Czihah, Austria; Daintree, Queensland; Dandoy, Belgium; Davis, South Australia; Decagny, France; Delié, France; Delon, France; Otero Diaz, Spain; Dupont (Antwerp), Belgium; Dupont (Brussels), Belgium; Durandelle, France; Eder, Dr. J. M.. Austria; Espagnet, France; Fabre (Toulouse), France; Fiorillo, Egypt; Fisk, England; Freeman, South Australia; Samuel Fry, England; Garin, France; Geiser, Algeria; J. Girard, France; Gilles Freres, France; Godillot, Algeria; Gobelmann, United States; Guerin, France; Gugier, Austria; Gurney, United States; Hare, England; Harrison and Co., France; Hedges, England; Heid, Austria; Henderson (enamels), England; Houze (de l'Aulnay), Gabon; Hunter and Co., Canada; Hutinet, France; Janart and Guillot, France; Julia, Spain; Junior, C. Argentine; Just, Austria; Klary, France; Kozies, Hungary; Ladrey, France; Lampué, France; Lamy, France; Liverpool Dry Plate Company, England; Loudon Stereoscopic Company, England; Lönborg, Denmark; Loudet B., Argentine Confederation; MacLaughlin, Canada; Marché (du), France; Mariou, France; Mawson and Swan, England; Maunoury, France; Mezzara, France; Michaud, France; Minister of Public Works, Japan; Molteni, France; Mora, Mexico; Muller M., Austria; Nobas, Spain; Numa-Blanc (Scarborough and Nice), France; Nûnes, Portugal; Pacht, Denmark; Pector, France; Peignot, France; Pellet and Co., France; Petersen, Denmark; Pierre Petit, France; Pinel, de la Chardiere, France; Pont, France; Poullenc and Wittmann, France; Poujade, France; Raoul, Russia; Rechnitzer, Hungary; Richard; Robin de Lormel, Caladonie; Roechini, Portugal; Rhomaïdès Peres, Greece; Rossetti, Italy; Rothschild, France; Rottmayer, Austria; Ruckert, France; Salzj, France; Saunier, Reunion; Sauvager, France; Schaeffer, France; Seavey, United States; Skeen, Ceylon; Sherlock, England; Szubert, Austria; Terpereau, France; Thorsen, Norway; J. Ainé Tourton, France; Truchelut, France; Trompette, France; Trutat, France; Ungar, Austria; Unwin Brothers, England; W. H. Wheeler, England; Van der Weyde, England; Yermakoff, Russia; York, England.

Honourable Mention.—Abdullah Bey, Egypt; Alker and Chotteau, Belgium; Antonopouls, Russia; Atchison and Co., Cape of Good Hope; Aubert, Norway; Audouin, France; Aumont, France; Barnard, France; Barthelamy and Co., France; Bate and Co., Uruguay; Beal, United States; Adolphe Beau, England; Beer and Mayer, Austria; Besso (Vittorio), Italy; Billon (Daguerre), France; Boake, New South Wales; Boiarski, Russia; Borris B., Greece; Boscher, France; Boulanger, France; Brun, France; Bruton, Cape of Good Hope; Burato, Austria Bureaux Freres, France; Cardinali, France; Carette (Paris), France; Carleman, Sweden; Carré, France; Castillo, Peru; Couton, France; M. Danesi, Italy; Davelny, Belgium; David, France; Paul Delondre, France; Demaria, France; Deyrolle, France; Dubroni, France; Dufour, France; Eckert and Mullern, Austria; Ferrié, France; Fiorillo, France; Fleurquin and Co., Uruguay; Foucher, France; Fouquet and Guetant, France; Frattacci, Italy; Frossmaun, Cape of Good Hope; Fruchier, France; Gilbert, France; Goldbolt and Basebe, England; Gotz, Russia; Gouin, France; Greenfeld, New South Wales; Greiner, Holland; Guérin, Belgium; Guidi (St. Remo), Italy; Guidi (Florence), Italy; Guilleminot, France; Guler, Switzerland; Viscount Hainoque de St. Senoch, France; J. Haller, Belgium; Harboc, Denmark; Hoch, Russia; Jankovich, Italy; Jellasco, Austria; Jesoutschefski, Russia; Joergensen, Denmark; Julian la Ferriere, France; Knudsen Berzen, Norway; Lacroix, Switzerland; Lafargue, France; Largajoli, Austria; Ledentu, Guadaloupe; Lemere and Co., England; Lemuet, France; Linck, Switzerland; Livernois, Canada; Lize, France; Lochard, France; Lombardi and Co., England; Lopez-Fabra, Spain; Lorent, Austria; Lory, France; Loup, France; Maltby, England; Mandar, France; Marti, Spain; Meus-Verbeke, Belgium; F. de Mezer, Russia; Michelez, France; Montreuil, France; Morin, Island of Trinidad; Nettleton, Victoria; Newman, New South Wales; Nitikine, Russia; Noone, Victoria; Notman, Canada; Notman and Fraser, Canada; Olsen, Norway; Ortolani, Austria; Osti, Sweden; Ozanam, France; Panagopoulos, Greece; Patte, France; Pereira, Portugal; Pereira Sousa, Portugal; G. Pereire, France; Pedra, Algeria; George de la Personne, France; Person, France; Poole, Canada; Porgerin, France; Portier, Algeria; Pricam, Switzerland; Alexandre Guinet, France; Ravasz, Hungary; Raynaud, Belgium; F. de Reisinger, Austria; W. Roe, Cape of Good Hope; Roman, France; Romanet, France; Rubins, France; J. M. Santos, Portugal; Miss Schpakowski, Russia; D. Scott, New South Wales; Secretary of Native Affairs, Cape Town; Someliani, Guatemala; Staudenheim, Austria; Stephan, Switzerland; Stern, Hungary; G. W. Sweet, South Australia; Szaciuski, Norway; Piffereau, France; Tillge, Denmark; Tillot, France; De la Tombele, France; Vallette, France; Verryck, Belgium; Veysset, France; Watkins, England; Welti, Switzerland; Whiting, England; Widmayer, Switzerland; Wilz, France; Zamboni, Hungary.

CLASS XV.—INSTRUMENTS OF PRECISION AND OPTICS.

Jury.

M. Broch, Sweden and Norway, President.
Colonel Laussedat, France, Vice-President.
M. Cornu, France, Reporter.
Lord Lindsay, Great Britain.
G. Colombo, Italy.
De Fleischld, E., Austria.
L. Soret, Switzerland.
Vice-Admiral Mouchez, France.
Commandant Perrier, France, Secretary.
M. Bardoux, Sen., France.

Gold Medals to English Exhibitors.—J. H. Dallmeyer *(Rappel)*; Howard Grubb; A. Légé and Co.; Negretti and Zambra; T. Ross and Co. *(Rappel)*; Sir W. Thompson.

Silver Medals to English Exhibitors.—H. Crouch; G. B. Glover, China; Horne and Thornthwaite; M. Pillisher; J. Swift; S. Tisley and Co.

Bronze Medals to English Exhibitors.—Cetti and Co.; Royal Commission of Victoria; Dollond and Co.; Hearn and Harrison, Canada; Sir C. Layard, Ceylon.

Honourable Mention.—F. Darton and Co.; Charles Potter, Canada; A. E. Thomas.

W. HARRISON.

Asnières (Seine), October 19, 1878.

BALLOON PHOTOGRAPHY.

THE balloon experiments at Woolwich have, besides demonstrating the possibility of making military *reconnaissances* by means of balloons, opened an interesting field for an assault by the photographer's camera.

Captain Templar has succeeded in showing that a well-known laboratory experiment may be utilised in the field for the purposes of warfare, and has already raised military ballooning into an art that must not be neglected. Hydrogen, the lightest known gas, can be prepared by decomposing steam, and Captain Templar has demonstrated that it may be obtained in a rough-and-ready way fashion from materials that can easily be carried with the other *impedimenta* of an army. A supply of steam, a furnace, and an iron tube, with a quantity of iron turnings or shavings, are all that is necessary, and, as M. Giffard has proved that it is possible to construct a balloon that will retain hydrogen gas for apparently an indefinite time, the problem has been so far satisfactorily solved. Steam is passed through a tube containing red-hot iron; the oxygen of the steam is seized by the iron, and hydrogen is liberated, a few hours' working being sufficient to inflate a balloon capable of lifting 70lbs. for every 1000 cubic feet of hydrogen gas contained within its envelope.

Mr. Woodbury has taken advantage of these experiments to try some of his ideas in balloon photography, and we may soon expect to hear that he has been successful. Captain Templar proposes to elevate an observer with his balloon, who is to report what he sees; but Mr. Woodbury's idea is to send up a camera and to photograph the scenes exposed to view. The rope holding the balloon contains one or more electric wires, which, at the proper time, can be made to uncap the camera and so take a picture which will enable the commanding officer to ascertain the positions of the enemy without relying on the eye observations of an aëronaut. By a very simple arrangement—which, however, needs a battery—Mr. Woodbury proposes to take four negatives, which will give views of the surrounding country in four different directions if required, or take four pictures of any given spot; and it is said that he has succeeded in devising a method of preventing the balloon from gyrating—the great difficulty that has hitherto been found impossible to overcome in taking pictures without an operator near the camera. So far as we have heard no photographs have been taken from M. Giffard's captive balloon at Paris.; but Mr. Woodbury found on making application that the "right" had already been sold. It is presumed that those who have acquired the right have been unable to surmount the obvious difficulties, and the experiments at Woolwich are consequently studied with more than the average amount of interest.

Captain Templar is endeavouring to compress hydrogen and store it in steel bottles, so as to carry a supply in an ordinary military waggon into the field; but, if Mr. Woodbury can succeed in rendering his camera automatic in its action, it would facilitate the operations by rendering it unnecessary to inflate the balloon to such an extent as would be needed if an observer had to be carried in the car.—*Echo.*

NOTES FROM THE NORTH.

Little things go a great way both in giving comfort and contributing to success. As winter approaches a large number of photographers will doubtless, as usual, suffer from many of the ills incident to a low temperature. Here is a "wrinkle," cheap and efficient, by which the bath, at least, may be kept at such a temperature as to ensure immunity from many of these ills. I saw it in the laboratory of one of the most popular Edinburgh photographers a few days since, and he, I believe, copied it from Mr. Bruce, of Dunse.

The bath or baths, for there were several, were fixed at a suitable angle in a box with a tight-fitting lid. They were placed a few inches apart, and into the space so made was slipped an ordinary rubber hot-water bottle filled with water at a suitable temperature. This, of course, can easily be changed as often as may be necessary; but if the box were made double, with a space of an inch or two between the walls, and the space packed with a non-conducting material, such as the woollen shoddy sometimes used for stuffing cushions, a single supply of hot water would keep up an uniform temperature during the whole working hours of a winter's day.

Another wrinkle, in the direction of economy, I saw in the same studio, inspired, I think, from the same quarter. Everybody knows that the great bulk of the free silver on the surface of a wet collodion plate is reduced by the developer, and that in the majority of cases it is run into the sink, very few taking the trouble to recover it, although where much work is done such saving would amount to a good many pounds annually. In the dark room alluded to the hole in the bottom of the sink was plugged up, so that the only means by which the water could escape was by the overflow openings. The sink was, in consequence, always full, and the reduced silver settled at the bottom, ready for removal periodically. To prevent the sediment being disturbed by a too-sudden influx of the developer the sink was covered with a wooden tray a few inches in depth, the bottom sloping gradually to a hole in the centre. The solution when poured from the plate fell first into this and then flowed gently into the sink below, the reduced silver falling to the bottom, while the water and soluble salts ran out by the overflow. Those who have not considered the silver recoverable from the process of development worth the trouble which they suppose it entails would be surprised at the quantity of valuable metal they have hitherto wasted, as it must indeed be a small trade in which the cost of the saving apparatus would not be covered during the first month. I need hardly say that neither hypo. or cyanide should be allowed to enter the sink so prepared, but I presume most operators fix by immersion in a bath; and while, where convenient, it would be well to have a separate sink over which to do the washing after fixing, in the absence of such an arrangement it may be safely done over the depositing tray.

Photographers who are sufficiently acquainted with art to be able to do a little water-colour sketching, or who include in their staff an artist fairly competent, might extend their business by adopting an exceedingly attractive and effective style of animal portraiture, a specimen of which I saw recently in the reception-room of one of my friends. It was the portrait of a fine, large dog, lying in a state of repose, introduced into the foreground of a pretty sketch consisting of a lake or river and distant mountains. The portrait, although painted all over, possessed the true photographic fidelity which so few artists of the brush can produce; while the rest of the picture, although subservient to the principal figure, was so brought into relation with it as to make an exceedingly perfect whole. The *modus operandi*, as explained by the artist, was very simple. A suitable negative of the dog having been obtained, the background was stopped out and a print made in the proper place on a sheet of Whatman's drawing-paper. This having been worked upon with water-colour in the ordinary way, the landscape was then copied from a sketch previously selected. The effect was certainly very fine, and could not fail to attract attention wherever it might be exhibited—a union, in fact, of fine art and photography that is perfectly charming.

Amateurs whose convenience for the preparation and drying of plates are limited are not unacquainted with the annoyance of occasionally, from inadvertence, opening the dark room door while the lid of the dry ng-box is open, and so exposing the whole batch of plates to diffused white light. Such a momentary exposure has little effect on slow bath or emulsion plates; but on the more rapid gelatine varieties it most certainly induces fogging propensities, and, consequently, ought to be guarded against. Here is a self-acting arrangement I saw in operation in the dark room of an amateur a few days ago, and which is both simple and efficient:—The drying-box was a kind of cupboard in front of the work bench, having a number of shelves, some of which were carefully levelled so as to let the plates set previous to their being placed on edge to dry. To economise space the door or shutter was counterpoised and made to slide down to the level of the lowest shelf when plates were being taken out or put in. The door of the dark room was kept shut by a spring bolt, which could be opened by turning a knob on the inside. Fastened to the wall and a little to the right of, and in a line with, this knob there was a piece of wood in the form of a lever, one end of which was connected with the sliding shutter, while the other, when in a horizontal position, covered the knob. The arrangement was such that while the shutter was up and the plates covered the lever was down, leaving the knob uncovered; but while the shutter was down the lever so protected the knob that the door could not be opened till the drying-box was shut. Of course the details of such an arrangement will vary with the nature of the fittings of the dark rooms to which it may be applied; but here is the idea, and each operator may work it out for himself. John Nicol, Ph.D.

(To be concluded in our next.)

ON THINGS IN GENERAL.

The Battle of the Lights is coming on. The ground is being cleared, and very soon the people of this country will have a fair chance of judging for themselves the relative merits of gas and electricity. What a panic has seized the holders of gas shares! They seem to think the beginning of the end is already in sight, and they hasten to realise their cash ere their capital vanishes. Foolish shareholders! However, it is the old story of scientists *versus* the populace, and whatever the result photography cannot but be the gainer when electric lighting of some form and in some degree becomes realised in every town of importance, as is sure to be the case before very long—that is, if the lawyers do not stop it—for it is true that the process has got a footing in the country. It is already in Chancery.

I have been reading lately letters from well-known photographers recounting the churlishness of some provincial photographic nobodies who declined to allow the use of their dark room for changing a few dry plates. Perhaps one ought not to be too hard on them, for it is quite possible their dark rooms were in such a state of dirt and disorder that they were ashamed to let any one see them—a not unlikely supposition, judging from dark holes I have looked into in various places. I thought the old days of exclusiveness and want of fraternity among photographers had died a natural death; but so long as processes and process-mongers find buyers and victims one must expect ignorant secrecy to prevail in places.

There is certainly another side to the question. No one likes a rival to overhaul his premises, and these cases may also be explained on the grounds of fear of something of the kind. Thus, I know a well-authenticated case where the same man was treated in such a manner twice over. A vendor of apparatus gained admission to the studio of the photographer in question, making as many excuses as possible to get a good inspection of the place, and very shortly afterwards opened a studio within a quarter of a mile. The second case was still more gross.

I read the other day in one of the foreign journals an account of a case of adulteration of nitrate of silver. It turned out, as might be expected, a case of accidental substitution. My experience of nitrate of silver is that, in England at least, it is obtained in a remarkably pure form, and at a price which is a standing subject of marvel to me. I cannot, however, say the same of chloride of gold, as I have come across samples of that chemical not possessing one-half of the toning power of others.

I was much interested in reading Dr. Nicol's remarks upon side *versus* top lights in America. Doubtless there is a good deal in the question of necessity; but it is a very proper subject to have brought before any body of photographers who have not even got rid of the dogmatic dicta enunciated in the time of "the great Silvy"—that a large extent of side-light was an essential condition in obtaining good results, and that, indeed, most of the success attending M. Silvy's pictures was owing to his having seen and utilised the vast advantages of such a form of room.

In reading the report of the same meeting I was much amused with the remark of one gentleman who has contributed papers to photographic literature (if I do not mistake the name) well worth reading. He would have the pretty women put on a plain background, and the plain women on a pretty background, so that the latter would be the more prominent part of the—one cannot call it picture. I could not help calling to mind the advice of Lady Dorchester to the Queen when the latter suggested to King William that Sir Godfrey Kneller should paint the court beauties. "Madam," said the lady, "if the king were to ask for the portraits of all the wits in his court, would not the rest think he called them fools?" And so, Mr. Neilson, what would a lady say if her *carte* were sent home with an elaborate fancy background? Would she not very soon "take her custom away" from the man who wrote her down plain? Free Lance.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 31	Liverpool Amateur	Free Library, William Brown-st.
,, 31.	Oldham	Hare and Hounds, Yorkshire-st.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The annual meeting of this Association was held at the residence of the Honorary Secretary, Mr. H. A. H. Daniel, on Friday, the 18th inst.,—Mr. T. Davey in the chair.

The minutes having been read and passed, Mr. Steevens was unanimously elected an ordinary member of the Association.

The Hon. Secretary then read the following—

ANNUAL REPORT.

In presenting the report for the past session your Council desires to state that, generally, the Association is steadily advancing, and making itself more widely known; nevertheless, there is considerable room for a greater amount of interest to be taken in the Association's proceedings, and more constant zeal in endeavouring to increase its roll of members.

The following communications and papers have been read before, and contributed at, the meetings:—

The Splitting of Negative Films. By Dr. Mantell.
Exhibition of Pyro. Hydrogen Light.
Trial of Lanterns.
Whims of a Landscape Photographer. By Mr. E. Brightman.

Your Council has pleasure in stating that the financial position of the Association is satisfactory, there being a balance in its favour.

There have been seven indoor and one excursion meetings during the session; and your Council is glad to find that the attendances have shown an improvement on the preceding session, with the exception of the excursion meeting, which, contrary to the general rule, was not so well attended. At the same time, every person present at the latter operated, which has not been the case previously.

Your Council, in concluding the report, desires with still greater emphasis to impress on the members generally the fact that *each one individually* is to a very *large* extent responsible for the success and usefulness of the Association, as by allowing one's interest in the meetings to vary, and one's attendance to be interfered with by anything not of the utmost importance, poor meetings result, thereby lessening the attractiveness of the meetings of the Association to the remaining and attending members.

Your Council is most desirous that the prosperity of the Association should increase rapidly and its usefulness be widely spread, and, therefore, urge on every member the great desirability of speaking of it and making it known as much as possible, and of recruiting for its ranks as many new members as possible in every way.

Lieutenant Lysaght proposed the adoption of the report, and remarked upon its generally satisfactory character. This was seconded by Mr. Brightman, and on being put to the meeting by the Chairman it was carried.

The accounts of the Association having been audited and found correct,

Mr. H. A. H. Daniel (Hon. Secretary) said there were one or two matters he desired to bring before the meeting. The first thing was to read a letter from the President, Mr. W. W. Stoddart, desiring that a fresh President should be elected, as he found that the number of things he now had in hand were too many, and his health, he feared, would not be able to stand the strain if continued. This communication he (the Secretary) knew would be heard with great regret by every member of the Association, as Mr. Stoddart's great scientific knowledge, and his most genial bearing and valuable contributions to the Association, when circumstances permitted him to be present, could not be overrated.

After some conversation on the subject it was decided to ask Mr. Stoddart to reconsider his determination, and to assist the Council in selecting a third vice-president for election by the Association.

The Chairman considered that the best course to pursue, as the present President was a gentleman whom the Association could ill afford to lose.

The Secretary then introduced a subject which claimed a certain amount of careful consideration, viz., the question of having a monthly journal, with full accounts of meetings, &c., circulated amongst the members, as proposed some little time since, in conversation, by Mr. Brightman. He (the Secretary) pointed out that it had been thought it would be a very acceptable arrangement to the corresponding members, as at present those who were almost always debarred from attending the meetings at all during the year seemed very isolated, and that if the proposed journal were instituted it was felt that this state of things would be very much improved.

After being discussed it was decided, on the motion of Mr. Brightman, seconded by Lieut. Lysaght, that a journal of the kind described be circulated each month, and that every member be supplied with an almanac at the end of the year.

Lieut. Lysaght detailed some of his experiences with Swan's dry plates, having been much pestered with blistering of the film and could not thoroughly account for it. The plates of his own make (also gelatine), when subjected to identically the same treatment, showed no signs of behaving similarly.

No one else present had experienced this, and

The Chairman handed round the first two of Swan's plates he had tried, which were thought to be quite a success; and, when compared with some collodion emulsion plates, even allowing for defects, seemed to be of a more delicate quality.

Mr. Brightman remarked upon the great sensitiveness of, and certainty in using, the plates in question.

Lieutenant Lysaght stated that he was making some rather important experiments in connection with the *making* of gelatine emulsions, and, if the results were what he expected, he would communicate the details to the Association.

The Secretary having made a few hopeful remarks as to the opening session, the meeting terminated.

An outdoor meeting of the above Association was held in August last, when the members journeyed by rail to Tintern, meeting some members of the Cheltenham Society, by pre-arrangement, at Chepstow. The total number present was not very large, but everyone came prepared to work, of which a good amount bid fair to be done, ranging from 10×8 to 7×5, by both wet and dry processes. However, hardly had everybody got fairly into harness and made a few negatives, when one of the "blue mists" which thunder weather generally spreads over the luxuriant verdure of Tintern, enveloped everything, and work was practically put an end to. The commissariat department was then carefully attended to at that most charmingly-situated little hotel "The Beaufort Arms;" after which all rejourneyed towards home, the "dry men" anxiously awaiting the results of "development" and the wet men thankful for the little they had.

Correspondence.

TRANSPARENCIES.

To the Editors.

Gentlemen,—I shall be glad if you will publish the few following remarks respecting my transparencies, to prevent anyone who may view them, while now in the Exhibition, from feeling disappointed with the process by which they were produced after, perhaps, having read so much in its favour.

The only time I had at liberty for the preparation of apparatus and accessories for use in, as well as for, these productions, was before half-past seven in the morning and after half-past six in the evening, most of the negatives, which are very simple in character, being secured by carrying out moist plates from my house as opportunities arose.

The object I had in view in exhibiting them was simply for the purpose of breaking the ice in this particular branch of our art-science once again, and not as specimens of art or photographic perfection, to expect which, under the above circumstances, would have only caused me much disappointment, many effects being quite outside the extremely limited time at my disposal.—I am, yours, &c., John Harmer.

Wick, near Arundel, October 18, 1878.

THE ENAMEL AWARDS AT THE PARIS EXHIBITION.

To the Editors.

Gentlemen,—Referring to the above and Mr. J. R. Sawyer's letter, also his remarks in The British Journal of Photography and *Autotype Notes:* in the first place allow me to correct the error Mr. Sawyer has made when he imputes "want of courtesy" to me, in consequence of my not informing him that I intended publishing the letter I sent him. Why! I asked him to inform the person who reproduced his *Autotype Notes* remarks. What is this but publication?

I am in the happy position of having no trade interests to respect. So my tongue is untied and I speak out fearlessly. One thing I do know—that the less Paris Exhibition medallists say regarding the way they have obtained their medals the better. Since the awards were made known "a little spirit of mischief" has just revealed the following facts, which require some elucidation:—

A certain English exhibitor, whose work no honest person could deny as surpassing all others in his branch, was asked by several jurors for examples of his work to take home to their respective countries, at the same time informing him that he must get the highest award. The artist complied with the request; but it is presumed some irregularity must have taken place in the distribution of the complimentary proofs, as the highest award was *not* granted. On making inquiry, one of the "knowing ones" informed him that "had he replied, and complied with the request, the award would have been otherwise."

Returning to enamels: I certainly object to any one criticising my work who is *un*able to tell the difference between highly-finished paintings and untouched enamels. Mr. Sawyer, with all his "thirty years' experience in ordinary photography," might as well judge of the quality of an autotype print after it has been painted all over as to give his opinion of ceramic photography at the Paris Exhibition. I am sorry for this state of things. What photographers require is a process that demands little or no artistic work, and anyone who has worked the "dusting-on" process knows what kind of plain enamels they are.

Some more strange rumours are afloat here regarding the awards, the particulars of which I will reserve for a future occasion.—I am, yours, &c., A. L. HENDERSON.

Grand Hôtel Bergère, Paris, October 22, 1878.

[While we can readily enough believe that the large French photo-enamels which obtained the highest awards may owe much, if not all, of their merit to the dexterous manipulations of the skilled retoucher on ceramic work, and that therefore they may in *technical* perfection be inferior to those exhibited by Mr. Henderson, we think that in the charge brought, on hearsay evidence, against the honour of the jurors in regard to the medal of the other exhibitor there must be a grave mistake. Jurors at photographic exhibitions have undoubtedly obtained an unpleasant amount of notoriety for alleged favouritism; but it is impossible that such a body of gentlemen as that of which the jurors in Class XII. at the Paris Exhibition is composed could have stooped to an act like that recorded merely because the exhibitor withheld the cheap bribe of a few prints; and we have no doubt that the jurors will themselves be more amused than angry at such an allegation.—EDS.]

APPLICATIONS FOR NEW PATENTS.

June 25, 1878.—"Improvements in Head and Body Rests. No. 2544.'—E. E. EMMERSON.

June 29, 1878.—"Photographic Camera Shutters. No. 2608."—D. H. CUSSONS and A. COWAN.

July 1, 1878.—"Pigment Compound to be Used in the Preparation of Carbon Tissue. No. 2631."—O. SARONY and J. R. JOHNSON.

July 9, 1878.—"Taking Instantaneous Photographs of Objects in Motion. No. 2746."—E. MUYBRIDGE.

July 12, 1878.—"An Improved Method of Photo-Chemical Printing. No. 2800."—W. WILLIS.

August 12, 1878.—"Portable Photographic Apparatus. No. 3184."—J. TIATOR.

August 13, 1878.—"Poikilography. No. 3196."—A. LOMBARDI.

September 2, 1878.—"Improvements in Photographic Lenses and the Means for Focussing the Same. No. 3465."—J. A. KNAPP, F. W. KAMPING, and R. Y. SPRING.

October 7, 1878.—"Photographic Printing Frames for Combination or Chromotype Printing. No. 3941."—J. T. LANE.

October 11, 1878.—"New and Improved Process for Obtaining Coloured Photographic Pictures. No. 4023." — J. B. GERMEUIL-BONNAUD.

October 12, 1878.—"Photographic Cameras. No. 4032."—A. STEGEMANN.

October 18, 1878.—"Photographic Typography and Engraving. No. 4146."—C. BOLHOEVENER and E. HEIDENHAUS.

Miscellanea.

HUSBAND'S PREFERENCE.—The following is an alarming evidence of the progress of the photographic art:—A lady, last week, had her likeness taken by a photographer; and he executed it so well that her husband prefers it to the original.

THE LATE FIRE.—Messrs. George Matland and Co. write:—"We have secured temporary premises at 163, Cannon Street-road, Commercial-road, where we shall resume business on Saturday next, during the rebuilding of our former establishment.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The annual Technical Exhibition meeting of this Society will take place on Thursday evening, November 14th, in the large room of the Society of Arts, Adelphi. Particulars may be known on application to the Hon. Sec., 57, Queen's-road, Peckham, S.E.

WEAVER'S EXPOSING SLIDE.—Mr. Weaver, of Runcorn, has forwarded to us a model showing a further improvement effected by him in his camera-shutter recently described in a sub-leader (page 434). Mr. Weaver has altered the form of construction while retaining the principle, the peculiarity of the alteration enabling anyone, however little skilled in mechanical ability he may be, to adapt the invention to his own camera. It is now applicable to any bellows-bodied or sliding camera without the necessity previously existing of cutting a slot in the camera. This shutter deserves to find favour on account of its simplicity and efficiency.

POTASSIC PERMANGANATE AND CAUSTIC SODA AS A TEST FOR HYPO.—In the *Deutschen Photographischen Notizen* Herr Fritz Haugk recommends potassic permanganate and caustic soda as a delicate and inexpensive test for hyposulphite of soda. As the test is very simple and likely to be very useful no excuse is required for giving Herr Haugk's words here at length. He says:—

"Potassic permanganate has long been known as a test for hyposulphite of soda; but by itself it can never rival starch and iodine in sensitiveness. Professor Böttcher, of Frankfort—a very skilful and learned experimentalist—finds that a solution of potassic permanganate becomes much more sensitive to hyposulphite of soda when a little caustic soda is added to it. Böttcher's formula is as follows:—Dissolve one decigramme of the purest potassic permanganate and one gramme of chemically-pure caustic soda (prepared from sodium) in half-a-litre of distilled water. The red fluid instantly loses its colour and becomes green on the addition of the slightest trace of hyposulphite, owing to the deoxidation of the permanganate. Unfortunately to most photographers these chemicals in the absolute degree of purity prescribed by Böttcher are not always accessible; I have therefore tried whether less pure chemicals could not be used with good results. Of course one would not expect to get such remarkable results with the less pure chemicals as with those that are perfectly pure, still the results obtained are sufficiently satisfactory for everyday work. For such work it is sufficient to dissolve a grain of potassic permanganate the size of the head of a pin in about 400 cubic centimetres of water, and to add to this solution from fifteen to twenty drops of caustic soda solution, such as may be bought from any chemist. If after standing some time a brown precipitate be deposited, decant carefully into a clean bottle. In no case should one try to remove the precipitate by filtration, as the solution would thereby be decomposed and its property as a test perfectly destroyed. It may, however, without injury be filtered through glass cotton. A solution of potassic permanganate prepared in this way is considerably more sensitive than starch and iodine. If about ten c. c. of it be poured into a test tube, and a similar quantity of 1 : 40,000 hyposulphite of soda solution be added, the cochineal red colour of the permanganate solution will instantly be changed into a bluish-green. If a similar quantity of 1 : 60,000 soda solution be added the permanganate solution will immediately become violet-blue. With a solution of 1 : 100,000 the permanganate solution becomes lilac; and with a still more dilute solution pale lilac. When perfectly pure chemicals are used, as prescribed by Böttcher, even the presence of a millionth part of hyposulphite of soda may be detected by a distinct change of colour."

THE FATAL EXPLOSION IN GRAY'S INN ROAD.—Dr Hardwicke held an inquest at the board-room of the offices of the Holborn Board of Works, Gray's Inn-road, on Friday last, the 18th. inst., relative to the death of Mr. Edward John Wrench, aged 24, optician, who was killed on Wednesday by the explosion of a gas retort on his premises, 37, Gray's Inn-road.—Edward Newstead, solicitor, Gracechurch-street, identified the body of deceased as that of his cousin. He was in conversation with Mr. Wrench, Sen., on Wednesday, about noon, when they heard a loud report. Mr. Wrench went upstairs. Witness followed, and met a woman on the landing, whose face was covered with blood. The deceased was then being carried downstairs by two workmen, insensible. He immediately obtained medical assistance, but in a few minutes Mr. Taylor pronounced his cousin to be dead. The window sashes were blown out, and the glass broken. The grate was blown into pieces, and the fireplace was a heap of bricks. He did not see any trace of the retort. Deceased was in the habit of making oxygen gas, and was generally most careful in the process.—Mr. Reginald Taylor, surgeon, Gray's Inn-road, said when he arrived at the scene of the accident deceased was lying on the second floor insensible, and in a state of collapse. He ordered brandy, but deceased could not swallow it, and only lived about ten minutes, the cause of death being collapse and loss of blood from severe wounds in various parts of the body.—Mrs. Elizabeth Gibson, who was led into court, her face enveloped in bandages and blind, said she was assisting deceased in making oxygen gas. The retort had been on the fire, but having turned on its side deceased set it right again. A few minutes afterwards it exploded, and the whole of the gas flew in her face and burnt her. She was then near the door, which suddenly closed. As she got into the passage deceased called out, "Oh, Mrs. Gibson!" She was then blind, and did not know what followed.—Wright, G 175, deposed that he saw the window sashes blown into the street, and going up into the room found it full of smoke.—Mr. Allardice deposed to finding the retort and the broken cup and tube.—Mr. W. Valjee Simons, 19, Langley-road, Kennington-park, analytical chemist, said, after hearing the evidence of Mrs. Gibson, he was able to account for the accident. He called the same afternoon on which it took place, and searched the room and found the retort and tube. The turning over of the retort into the fire would cause some of the oxygen mixture to fall into the cup, and thus choke the tube, causing the retort to explode, as the gas could not escape. He was told that the deceased had not put the whole of the oxygen mixture into the retort but had left some on the counter, but he could not find it. He sent for some to the place where deceased usually purchased it, and found it to be pure.—By a juror: I see that there is a screw over the cup; do you not think if there had been a valve in place of a screw the gas would have escaped, and thus averted the accident?—Witness: Yes, that is so. I usually put in a plug with white lead, so that if the retort gets too full of gas it blows the plug out, and no accident occurs. This retort is one of the strongest; indeed, it would have been better had it been weaker. I have known the plug to be frequently blown out of the retort when I was engaged making this gas.—The jury returned a verdict of accidental death.

EXCHANGE COLUMN.

Wanted, The British Journal of Photography, posted Mondays, in exchange for apparatus, &c.—Address, F. S., Whitley Brow, Melksham.

I have 200 negatives of actresses and celebrities, by Fradelle and Marshall, to exchange for anything useful.—Address, W. Slater, 166, Grange-road, London, S.E.

Wanted to exchange, a glass bath, 15 × 20, in box, for lantern photographic slides, or anything useful in photography.—Address, G. Schofield, Heaton Mersey, near Manchester.

Wanted Grubb's patent aplanatic lens, A_0, and good studio or field camera, in exchange for enlarging camera. 15 × 12, or field camera, 12 × 10; must be good.—Address, C. Watson, 4, Kirkgate, Ripon.

Mahogany expanding camera, with double combination *carte* lens, adapted for either portraits or views, with complete set of chemicals for wet plates, will be exchanged for scenograph with chemicals, or good pocket camera.—Address, J. B., Kirkfield Bank Post Office, Lanark—to be called for.

ANSWERS TO CORRESPONDENTS.

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

PHOTO-MECHANICAL CORRESPONDENCE.

J. James.—Paraffine oil is an excellent fuel to employ, as the products of its combustion have not that injurious effect on bichromated gelatine which is known to frequently follow the use of coal gas. Very convenient stoves for burning paraffine oil can now be obtained for a small sum at many oil shops.

Stanley.—The addition of soap to the ink employed in making a photo-lithographic transfer is very objectionable, as traces of the soap often adhere to the whites of the paper, and this leads to a tinting of the corresponding parts of the stone. In making a transfer from an engraved plate an ink containing soap may be employed.

GENERAL CORRESPONDENCE.

W. X.—The spots are probably due to careless manipulation, as there are decided traces of finger-marks on the surface.

Calcium.—We have no knowledge of the special requirements of the bath you mention, but should imagine *any* good collodion would answer.

X. Y. Z —Let the sides be eight feet high, with a high ridge roof. Four feet may be left opaque at each end of the roof, but glaze the sides up to the end.

James C. Archer.—The mottled, yellow appearance of the prints is owing to their being fixed in a too weak or exhausted solution of hyposulphite of soda.

W. Wainwright.—Our correspondent asks if any reader can inform him of an apparatus for heating a small dark room, and which will not give off smoke or dust. He has no gas laid on.

D. C.—The only suggestion we can make is to stop out the background in the negative with Bates's black varnish, making use of a magnifying glass and an unlimited amount of patience.

B. Egginton.—1. Paper sensitised upon a bath containing a large proportion of citric acid will keep white for several weeks.—2. Negative retouching varnish is now a commercial article. [See advertisements.]

J. W. D.—The appearance of the negative indicates that the collodion contains too much iodising material for the strength of the bath. Try the effect of adding about a fourth part of *plain* collodion to that which you are now using.

George B. Fox.—To fuse the crystals of nitrate of silver place them in a porcelain dish and apply the required heat cautiously. Avoid the application of too great a degree of heat, as decomposition is caused thereby. When fusion has taken place pour out the molten mass upon a clean iron or marble slab.

John Tanton.—We cannot advise any better means of securing a fair average in the quality of your pyroxyline than by mixing the whole of the samples, and carding them together so thoroughly as to ensure any one tuft, pulled out at random from the mass, to be perfectly similar in quality to any other tuft obtained in a like manner.

S. F. R.—While we cannot inform you of the *cause* of the blistering of the gelatino-bromide film (unless its having been subjected to an unduly high temperature affords a clue), we are able to indicate a remedy for, or, more correctly, a preventive of, this evil. It consists in making use of *hard* water for the various solutions and washings to which the negative has to be subjected.

A Bath Photo.—We strongly disapprove of the method you adopt of poising the large plate upon the ends or points of the fingers during development, because of the tendency of the parts touched to become heated and thus to cause unequal development. It will prove a better method to sustain the plate upon a pyramidal block of wood, its motions being guided by a finger and thumb applied to one corner.

Rev. T. B.—Stir a teaspoonful of chloride of lime into a vessel containing three or four ounces of water, and then add a few drops of hydrochloric acid, by which chlorine will be disengaged. In this solution immerse an iodised collodion plate after it has been sensitised in the nitrate of silver bath, first taking the precaution to wash it well with water. The film will by this treatment be converted into one of chloride of silver.

L. D.—It is the iodide in the old negative baths that prevents them from answering well for printing. The easiest remedy is to precipitate the silver by the insertion of a strip of copper. Any iodide that may be precipitated can be removed by treatment with a weak solution of cyanide of potassium. Or you may try the effect of adding a solution of citric acid, neutralising it with carbonate of soda. This is said to answer the purpose of effecting the conversion of a negative bath into a printing bath.

M. D. T.—A simple method of photographing leaves consists in superposing them upon sensitive paper, covering with a glass plate, and then exposing to light for a period sufficient to have caused their details to be visible upon the paper. Next fix in hyposulphite of soda, and wash. Toning will not be necessary in this case. By proceeding in this manner you will afford your antipodean friend quite as good an opportunity of studying the venous formation of the leaves as by sending the specimens themselves.

J. H. B.—Apparent motion may be induced in a stereoscopic representation of a subject by taking one picture of a movable subject, such as a man wielding a hatchet when the instrument is raised to its height, and another after the blow has been given and the hatchet has fallen. When a picture prepared agreeably with this principle is placed in the stereoscope, and is examined under such circumstances, and by the aid of an oscillating shutter, as to cause each eye to see its respective picture in rapid rotation and the two not to be seen simultaneously, the arm will then seem to be rising and falling. The phenomenon of persistence of vision has something to do with this peculiar effect.

S. S. George.—Mr. Tilley's method of putting in backgrounds in negatives consists in first exposing the plate to the sitter with a *dark* background; then, while the sitter remains immovable, let the dark background be superseded by one of a white or, at anyrate, light colour, a transparency of any landscape desired as a background having been inserted immediately in front of the sensitive plate previous to and during a brief secondary exposure to the white ground. Upon developing the negative the pictorial background will be found admirably produced behind the sitter. The method is ingenious, and is capable of various applications. We are not aware whether Mr. Tilley's patent is or is not in force; but it is more than three years since the patent was obtained.

Ignoramus.—This correspondent wishes to know in what manner she is to proceed in order to obtain a blue tone upon her prints. She has hitherto, during her limited experience in photographic printing, been making use of paper purchased ready sensitised, and has been toning in the carbonate bath. While we think that the tone she has usually obtained—a rather brownish-violet—is much to be preferred to that to which she aspires, we yet give a hint by which the blue tone so much desired may be secured. It merely consists in allowing the prints to remain in the toning solution a much longer period than she has hitherto been doing. Immerse three prints in the toning solution at the same time, and let one be removed after they have acquired a violet tint, a second after that tint has become of a pronounced blue tint, the third not being removed until it has passed into a kind of bleached-blue stage. Let these be fixed, washed, and dried, and it is probable that the last of the three prints will be of the tint desired by our lady correspondent, although in our estimation it will not be the most agreeable tint.

Geo. S. P. O'Hara.—You will not experience much difficulty in ascertaining whether it is the bromide of cadmium or the nitrate of silver that is in excess in the emulsion if you proceed as follows:—Prepare two solutions, one of nitrate of silver and the other of bromide of cadmium, distilled water being the solvent. The degree of strength is immaterial. Now, having placed a small portion of the collodion emulsion in a measure, add sufficient distilled water to precipitate the pyroxyline, and decant the clear supernatant liquid, to a little of which add one or two drops of the nitrate of silver solution. If there be a turbidity or milkiness formed you may be sure that there is excess of soluble bromide in the emulsion; but if the liquid remain clear it is an indication that if there be any excess at all it is that of nitrate of silver. To verify this add a few drops of the bromide solution to a fresh sample of the supernatant liquid, and if milkiness ensue you may rest assured that the emulsion contains an excess of nitrate of silver. The remedy is suggested by a knowledge of the nature of the excess.

The Manual of Photographic Colouring (by Joseph Wake).—This comprehensive work will be published on Thursday next, the 31st instant. Our readers will find that this volume contains in a handy form all that is necessary to know about photographic colouring in its various branches. For particulars see page iv. of our advertising sheet.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.
For the two Weeks ending October 23, 1878.
These Observations are Taken at 8.30 a.m.

Oct.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
10	29·24	96	64	56	56	58	SW	Cloudy
11	29·83	89	61	49	49	52	W	Fine
12	30·25	81	60	44	45	47	W	Hazy
14	30·18	92	62	45	49	51	SE	Hazy
15	29·96	—	59	48	52	54	E	Overcast
16	30·05	—	58	52	54	55	E	Overcast
17	30·00	—	58	53	53	54	SSE	Foggy
18	29·86	—	56	51	50	54	E	Overcast
19	29·78	—	59	52	52	55	E	Overcast
21	29·52	—	65	52	56	57	SW	Cloudy
22	29·21	—	56	47	47	49	WSW	Overcast
23	29·52	—	—	41	43	47	NW	Fine

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 965. Vol. XXV.—NOVEMBER 1, 1878.

FURTHER REMARKS ON THE USE OF BROMIDE OF COPPER.

It now remains for us to speak of bromide of copper on its practical application to emulsion purposes, for which use it has been specially recommended by Mr. Warnerke and others. We may first of all remark that, strictly speaking, the preparation we described last week is not perhaps absolutely pure; indeed abundant proof may be found that it is not, though it is quite sufficiently so for the uses to which it is proposed to apply it. If it be used in alcoholic or ethereal solution, as we have described, the sources of impurity are more numerous than if it be brought to the solid state. While in the first case the impurities may be of an injurious nature, in the latter they are preferably harmless chemically; the only inconvenience arising therefrom will be found in the necessity for determining the combining equivalent of each separate sample made.

We have spoken in our previous article of the liberation of bromine during the formation of the salt by the mutual decomposition of the bromide of potassium and sulphate of copper. This in itself would produce no further ill effect than the loss of a portion of the bromine by the formation of insoluble sub-bromide of copper, the liberated portion remaining in solution. But there is every reason to suppose that this free bromine in the presence of alcohol may result in the formation of *bromal*, which Captain Abney has stated to be a fog-producing element in emulsions; but, on the other hand, there is just cause to doubt the production of this substance—at least within the comparatively short time occupied in the sensitising of an emulsion—for we know that if bromine itself be substituted for a bromide in the collodion no such fogging results. In the case in question, however, the bromine and the alcohol are presented to one another under entirely different conditions, and it is, of course, quite possible that their reactions may therefore differ.

As proof that some abnormal formation does take place, it may be mentioned that, if the alcoholic or ethereal solution of copper bromide be kept for some time in a closed bottle without previous purification by evaporation, a peculiarly pungent and irritating odour is developed which differs totally from the well-known smell of bromine. It is less a "smell" than a suffocating exhalation, which has a painfully-irritating effect upon the eyes and upon the mucous membrane of the nostrils if accidentally inhaled. We have found that such a solution if long kept produces an undoubted tendency to fog when used in sensitising the emulsion, and even when comparatively fresh there is usually a slight tendency to veil the shadows, though not to such a degree as to prove of much importance. The dried product produces no such effect, even if redissolved and kept in solution for a considerable time. The reason of this is not far to seek, for it may readily be supposed that the impurities, if volatile, as they appear to be, are driven off in the act of evaporation, and that once got rid of there is no tendency to further decomposition of the bromide. We have tested the stability of the bromide produced in this manner by repeated solution and evaporation, using alcohol, ether, and water as the solvent, and so long as a temperature of about 200° Fahr. is not exceeded we have been able to notice no decomposition. If, however, the solution be evaporated over a naked flame instead of by the water bath a gradual disengagement of bromine occurs; but as far as we can see there is no formation of secondary products.

Perhaps the best test of purity we could apply is the combining equivalent of the salt. Five grains of the solid bromide of copper were dissolved in alcohol and tested with the volumetric silver solution. It was found that 6·8 grains of silver nitrate were necessary to complete the decomposition. Now, taking the formula $Cu\,Br_2$ and combining equivalent $\frac{223.4}{2}$ for cupric bromide, the theoretical quantity of silver nitrate necessary would be a trifle over 7·6 grains. But, working on the figures obtained in the experiment above, we arrive at an equivalent of 125; that is to say, 125 grains (one-half equivalent) would be necessary to decompose 170 grains (one equivalent) of silver nitrate instead of 111·7 grains—the theoretical quantity. This difference is sufficiently large to admit of the supposition that the bromide contained an equivalent of *combined* water; but a subsequent analysis proved this not to be the case.

Ten grains of the salt were dissolved in alcohol, and the solution passed through a small filter, previously thoroughly dried and accurately balanced. The filter was then washed by passing through it fresh alcohol until all traces of the colour of the bromide were removed; there then remained a somewhat bulky white powder. The filter, with the insoluble matter it contained, was then dried and re-weighed, and was found to have gained nearly one grain, though, from the bulky character of the precipitate, we had anticipated a wider difference. Ten grains of the substance tested contained then only nine of real bromide of copper, and working from that quantity the equivalent is reduced to 112·5, or so near to the theoretical figure as to leave no ground for supposing that the difference is anything beyond accidental or unavoidable error. A small portion of the powder ignited in the flame of a spirit-lamp imparted to it the characteristic bluish-green colour of copper, without any trace of the lilac or purple tinge peculiar to potash salts. The remainder dissolved completely in nitric acid, and ammonia in excess developed the well-known deep blue colour, showing the presence of copper. From this we may assume that the only impurity consists of sub-bromide of copper; if cuprous oxide were present the colour of the residue would be black, or nearly so.

The application of this "purified" salt to emulsion purposes is extremely easy; it is sufficiently soluble in alcohol at ordinary temperatures, forming a splendid deep ruby or port-wine-coloured solution. Here we notice another peculiarity of the chameleon-like salt, for under different conditions it presents a variety of colours, including black, brown, green, yellow, and crimson. In order to avoid subsequent trouble in the way of spots it will be well to dissolve the bromide in the alcohol, and to filter the solution before adding the pyroxyline and ether; this will present less inconvenience and loss than the filtration of a much stronger "bromising" solution to be added after dissolving the cotton. Moreover, under the latter circumstances, it would be necessary to employ hot alcohol in order to dissolve a sufficient quantity of the salt.

Forty grains of bromide of copper were dissolved in twelve drachms of alcohol and filtered—the filter being washed through with another two drachms of alcohol, to avoid, as far as possible, waste of bromide. Twenty grains of cotton and fourteen drachms of ether were then added, forming a collodion with much of the appearance of bottled stout, but with a slightly redder tinge by transmitted light. This was divided into two equal parts—one of which was sensitised with twenty-seven grains of silver nitrate, the other with thirty grains dissolved in the usual manner. The first emulsion was calculated to contain a very slight excess of bromide, while the other contained something under a grain and a-half of silver in excess in each ounce.

A remarkable fact is noticeable in the sensitising, and one which suggests the idea that the combination between the bromide and the silver in the emulsion takes place much more rapidly than is generally supposed. The colour of the collodion before sensitising is, as we have said, black, or nearly so; but immediately upon the addition of the silver the colour commences to disappear, and by the time the full quantity has been added the emulsion has acquired the ordinary appearance, and it is only by careful comparison with another, prepared by one of the usual salting formuæ, that the faint blue tinge imparted by the nitrate of copper can be detected. The change from the deep, dirty colour of the collodion to the delicate, creamy tinge of the emulsion is really surprising; and it is, perhaps, the suddenness of the metamorphosis that leads to an impression that the bromide is precipitated in a state of greater fineness than usual. Be this as it may, the emulsion does not differ in any material point as regards colour or general appearance from one prepared with cadmium or ammonium bromide.

In working qualities we find no distinctly-marked properties by which the bromide of copper emulsion can be distinguished from the ordinary ones we use, unless it be in the direction of cleanness of development and freedom from fog. In this respect all the samples we have prepared from what we term the "purified" bromide have been specially noticeable; but, as we had occasion to remark in the earlier portions of this article, there is occasionally a decided tendency to fog, and always a slight veil when the bromide is used without purification. The colour of the developed image also differs slightly from what we usually obtain, though this may be due rather to other conditions than to the bromide.

With regard to comparative sensitiveness we are not in a position to speak decidedly, as our opportunities for outdoor exposures have been very limited latterly; but, as far as exposures by artificial light under a negative may be taken as a test, we find the copper bromide to be about equal to cadmium and ammonium double salt, but with this difference—that the former gives under similar conditions a "pluckier" image. We cannot, however, offer any evidence in favour of the alleged advantage the cupric bromide is stated to possess in rendering feebly-lighted details, though it is true the circumstances under which our experiments have been made scarcely permit of our judging correctly what would be the effect produced in the camera. We find in transparency printing a wider contrast between the lights and shadows than would be the case with an ordinary emulsion; that, in fact, a flat negative gives a more vigorous print with the copper emulsion than is the case with one prepared from other bromides—a result which appears to be exactly opposite to the allegations mentioned above. If the advantage claimed were in the better rendering of subjects presenting *feeble contrasts* then we should be inclined to support it.

We have, however, to record two notable features in the behaviour of cupric bromide which seem to specially recommend it to our notice: we allude to the facility it affords for preserving an emulsion for a lengthened period in the presence of free silver, and also its favourable action upon the precipitation. With regard to the first, this is, we believe, the special function which Colonel Stuart Wortley claims for nitrate of uranium in his formula, and which Mr. M. Carey Lea some years ago stated to be common to most of the metallic nitrates, naming nitrate of copper as the one best adapted to the purpose. We may, therefore, in the present instance, attribute the effect to the nitrate of copper formed in the emulsion; and we may state that we have kept an emulsion containing an excess of a grain and a-half of silver to the ounce for forty-eight hours before precipitation without any restraining acid and without developing the slightest tendency to fog. This we have never been able to do with any of the bromides in ordinary use. Immediately before precipitation, however, we prefer to add one grain of citric acid to each ounce as a safeguard against accident.

The physical character of the precipitated emulsion, too, differs entirely from anything we have previously met with, partaking, as it does, neither of the powdery product obtained in some instances nor the hard, pellicle-like lumps which occur in others. The pyroxyline is precipitated in a fibrous mass like a bunch of moss, and when "pulled out" closely resembles tufts of wet tow, the fibres twisting and knotting together in a most peculiar way. In this form it presents every facility for thorough and rapid washing as well as for drying and re-solution, though inferior, perhaps, in this respect to the powdery precipitate. It is, however, easier to collect than the latter, and, more important, does not appear to suffer the same injurious action from the precipitation; indeed, there is very little to distinguish the image produced by the washed emulsion from that obtained after it has undergone that operation.

THE PHOTOGRAPHIC EXHIBITION.

[Fourth Notice.]

Poikilographs are not the only works of art exhibited by Messrs. Lombardi and Co., for this firm has also contributed a numerous collection of portraits varying in dimensions from cabinet size to enlargements. These pictures display graceful posing and excellent manipulation; but, as we remarked when critically noticing the works of another Brighton firm last week, we should like to have seen such a display of pictures free, to a much greater extent at anyrate, from the work of the retoucher.

The portraits exhibited by Messrs. Boning and Small are charming; among them a portrait of Miss Violet Cameron is singularly effective, the expression, posing, lighting, and manipulation being all alike good.—Mr. E. Fox must make friends with the hanging committee before he next sends pictures to the Exhibition, so as to prevent them from "skying" such a picture as his *Gulls* (21), which might with advantage have been made to change places with an enlargement suspended directly underneath. His other pictures possess an average degree of merit.

The exhibits of Mr. G. H. Dunmore prove the possession of great skill by this artist. His frame (331) contains several meritorious landscapes as well as good interiors.

The *Marian* (210) of Mr. W. M. Harrison is an ably-executed picture of large dimensions of a child, and the same must be said of *Popping the Question* (204). By some strange perversity on the part of the hangers these fine pictures are placed so high as to almost necessitate the use of a chair upon which to stand in order to examine their details, while two large direct heads, by the same artist, are placed on the line, whereas they should have been hung at least twelve inches higher.

Messrs. Chaffin and Son exhibit several large group and single-figure *genre* pictures. Of these *Visiting the Studio* (215) is probably the finest, as it certainly is the most imposing. An artist who has been painting a portrait, to be seen on the easel, is represented as showing it to a lady and gentleman who are presumably members of the family of the person represented on the canvas, and who are engaged in a close and critical inspection of the "counterfeit presentment" of their old friend. This picture is highly successful. Inferior to it is *Criticism* (203), by the same artists, owing to the introduction of the figure of a young lady seated on the right, her presence marring the effect of the artist—seen at work—and the lady critic who is looking over his shoulder. Upon the face of the former lady there is a sort of expression which might be embodied in the words "when pensive I thought on my love"—an expression admirable enough in itself, but scarcely in harmony with the general conception of the picture. Indeed if No. 203 were properly severed in two parts, each half would make an excellent picture; one portion being allowed to retain the title borne at present by the whole, while for the other half the designation *Day Dreams* would not be inapplicable. The *Meditation* (107), and *Expecting Jack Home To-day* (114), also by the same artists, are noble pictures, every way worthy of the reputation of Messrs. Chaffin and Son.

Mr. R. V. Harman's frame of views of Camden-place, Chislehurst, the residence of H.I.M. the Empress Eugenie, will receive a careful inspection on account of the interesting associations and memories which cluster around this regal residence; while the views of *Kentish Scenery* (302), also by Mr. Harman, will secure similar recognition, due to their intrinsic merits.

It is difficult to say which of Mr. A. G. Pettitt's nine large pictures of *English Lake Scenery* (316) is the finest; but it is probable that this pictorial *status* will be assigned to the *Study of Roadside Cottage* and to *Fisher Crag after a Shower*. These are excellent pictures.—The sunny land of Italy has furnished admirable subjects for the cameras of Captain Lyon and Mr. S. Thompson, while Mr. Andrew Pringle has, in a number of pictures contributed by him, confined himself mainly to Scottish landscapes; but among his exhibits, however, will be found a few cullings from Irish scenery.—Several nice woodland views are contributed by Corporal J. Miller, R.E.; and Mr. Greaves has two good enlargements of children.—Mr. H. Garrett Cocking exhibits several pictures, among which the portrait of *Madame Rose Hersee* (244) strikes the observer as being an excellent likeness of that eminent English *cantatrice*.

There is no intimation either in the catalogue or upon the work itself as to whether the noble photograph, *A Devonshire Mill* (49), by Mr. Henry Whitfield, is an enlargement or a direct photograph. In either case it is very successful, and it would have proved still more so if some of the "tricks of trade" had been resorted to in order to put more detail into the rushing stream on the right. Mr. Whitfield should lose no time in studying the great modern "art of sophistication."—Three large direct portraits by Mr. S. Wolstenholme evince great skill.—A charming and effective picture, entitled *Resignation* (228), is the sole illustration of the pictorial work of Mr. A. Brothers in the Exhibition; but even by this single exhibit he is most ably represented—no thanks, however, to the hanging committee, who have placed his picture by far too high.

THE SURFACES OF FILM SUPPORTS.

It is an unquestioned fact that the surface of the glass plate—which only we shall include in considering the bearings of our subject—has, though apparently perfectly pure and clean, under slightly-differing circumstances a most remarkable variety of states, capable of varying greatly in action; for, though in an article published some little time ago we pointed out the easy changeability, and indeed solubility, of the surface in a chemical aspect, the states we speak of may more properly be classed under the head of mechanical as opposed to chemical. The case of old plates with varnished films is one which obtrudes itself to a marked degree upon the photographic mind. How many hundreds of thousands, we might almost say, of such old negatives are there not at the present time waiting to be cleared off—the clearing being put off till the swelling heap of glass compels attention! Yet, of all these hundreds of thousands, how many when finished, every care being taken to make the surface as clean as possible, will the operator be able to use with confidence, and consider equal to new glass? And how many hundreds of negatives will be spoiled through using them? These are burning questions, for, to our knowledge, there lie in many photographic store-rooms, or other out-of-the-way places, glass plates that in quantity represent quite a little fortune, and yet which we do not hesitate to say the majority of the owners would willingly part with for half their cost, or for half the number of new plates.

A careful examination of the subject may lead to a practical acquaintance with the conditions governing the usefulness of various modes of cleaning glass surfaces and their consequent suitability for photographic operations.

We may better approach the subject by first ascertaining the grounds for believing that the conditions are mainly, if not entirely, of a mechanical nature, to draw a distinction which, if pushed to its limits, it might be very difficult to define, but which here may be described as the action of the glass itself as opposed to the action of imprisoned or surface-held chemical agents.

Continuing our examination of old plates in this light, the tendency to dirty pictures upon them is proverbial, and the explanation is that the glass is porous and retains a portion of the old image, which reacts upon the new, causing abnormal, or rather anomalous, deposition of silver between the film and the glass. The ease with which silver and many other insoluble formations are made to deposit upon apparently similar surfaces is well known, and has been well treated by Mr. Tomlinson in a variety of papers, published from time to time (and to these we would recommend any of our readers to refer who wish to take the subject up). It is therefore quite as reasonable to suppose that the uneven action of the developer is owing to a mechanically-altered surface and to the action of ingrained foreign matter.

We are so accustomed to look upon glass as an impenetrable solid—the saying, "smooth as glass," showing the popular estimation of the evenness of its surface—that it is difficult to believe that so smooth-looking a material can have pores upon its surface, and we must confess to a little scepticism on the point. It is one thing to have a comparatively soft or tender surface, and another to have one pierced with holes, so to speak. We have not seen any arguments advanced to prove that the exterior of a piece of glass, beyond this question of relative hardness, is in any way different from the interior; and if the whole texture of glass were full of these minute wells, or intersticial cavities, it would be almost opaque to light, or at least would present a milky hue quite different from the beautiful clearness that renders it so attractive an article in its decorative aspect.

We do not lose sight of the molecular constitution of matter, according to which theory all matter might be said to be porous; glass in particular is so, for there must be a multitude of cavities to permit of the presence of the ether through which the light vibrations travel. We speak of a coarser texture, as that is evidently the character assumed in those disquisitions on porosity which have been considered. But in surveying the subject from a chemical standpoint, it may be permissible to consider the molecular aggregation of its constituent elements.

An excellent argument in favour of the mechanical roughness of the surface is provided by the celebrated plane surfaces made by Mr. Whitworth. When put together they adhered most tenaciously, and for a time it was considered a satisfactory explanation to say that the pressure of the air was the cause. But it was found that theory did not account for several of the phenomena in question, and now it is explained that the surfaces adhere through the entanglement (if we may so term it), or the interlocking, of the particles composing the surface. Whether these are actual molecular particles or mere projections of larger size produced in the grinding may be open to doubt. We think, however, that the former is the more likely supposition, seeing that it is but reasonable to assume that the continual grinding would have taken off all projecting particles except such as were constituent and unchangeable or reduced to their smallest dimensions—that is, the final molecule.

We shall continue our consideration of the subject next week, and give the results of some interesting experiments we have made in connection with the photographic bearing of the question.

A NEW CURE FOR BLURRING.

At the October meeting of the Liverpool Amateur Photographic Association I stated that my experience during the past summer with my gelatine films had convinced me that their entire freedom from the nuisance of blurring was due to the slight yellowish tinge of these sheets. The idea naturally occurred to me that if we could obtain glass of this particular colour, for photographic purposes, from the manufacturers we should at once put an end to halation of all kinds. Since the meeting in question, the kindness of Mr. J. A. Forrest has enabled me to test my theory thoroughly; and the result of my experiments is, I am glad to say, a complete success. Mr. Forrest supplied me with specimens of glass of almost every variety of orange and yellow; but I selected for my purpose those only which were of that slight yellowish tinge with which all workers in gelatine are familiar, and of which an example readiest to hand may be found in a gelatine lozenge.

I coated my plates with gelatine emulsions of two kinds, viz., one which gave a very slow but dense film, and one made from Kennett's pellicle, which was moderately rapid. I chose a subject as a test which is infallibly productive of the evil with every kind of dry plate I have tried, and especially so with gelatine. This subject is the interior of a church, through the great east window of which a flood of light is poured, which usually obliterates all signs of mullions and tracery. The exposures were made under conditions of light and atmosphere which are invariably provocative of blurring in its worst form. The sun was shining brightly; but the wind was in the east, and the air filled with haze. In every case the test proved entirely satisfactory. The tracery and design of the window are visible in their minutest details, and not the slightest trace of halation exists anywhere in the picture.

This was conclusive, to my mind, and the only thing that still remained to be done was to ascertain if the yellow tinge of the glass would prove an impediment in the process of printing. This, however, was not the case, either as regards the time occupied in the process or in the brilliancy or excellence of the result. The prints were not more than a few seconds longer than those produced from negatives on ordinary glass, and the results seemed to me to be even better than would have been the case in dealing with a negative of similar density on a white glass plate.

The cost of these tinged glasses need not be greater than that of those in ordinary use, and I shall hope to find that some enterprising manufacturer will be found who will be willing to supply us with glass of this kind, and thus relieve us of all further trouble and difficulty in our efforts to get rid of the nuisance of blurring.

H. J. Palmer, M.A.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

There is a smart shower of snow falling as I write, which prompts me to inquire if many photographers do not commit a mistake in making the slope of the roofs of their studios too gentle to permit the snow being easily removable. Only a very slight angle of slope indeed is required in the case of rain, but after a snow shower it is of importance that the roof be cleaned without delay. The slope of the studio window described last week by Mr. Samuel Fry is such as to cause no grounds for the indulgence of this fear; but I am acquainted with another studio in which, previous to a recent alteration having been made, it was wellnigh impossible to operate during a severe winter owing to the almost perpetual lodgment of snow, which could not be easily removed. It is true that, as the proprietor informed me, very little business was done by him during the winter, and although the barrier of snow occasionally intercepted the light it consequently did but little harm; still, there are studios—in London, at least—in which from fifty to eighty negatives a day are taken even in winter, and in such cases the loss from a heavy fall of snow would be very severe were not proper measures taken to counteract the consequences.

The death of Mr. Edward J. Wrench, through the bursting of an oxygen retort, has caused a profound sensation in London lantern circles. As the oxygen mixture was pure, this fatal misadventure must be removed from the list of what I may designate "chemical" explosions, in contradistinction to "mechanical" explosions. By the former I mean the generating of a gas, such as hydrogen, along with the oxygen, and which forms with it an explosive mixture only requiring the presence of a spark or flame in order to give deadly effect to the compound. In the present instance the explosion was one of a *mechanical* kind; the outlet pipe was choked, and oxygen continued to be generated until the elastic force of the gas overcame the strength of the walls of the retort, when the latter gave way. I have been informed that no washing-bottle was employed on that occasion, but that the communication was direct between the bag and the retort. Such being the case, the chances of danger resulting from a stoppage of the outflow of the gas were infinitely increased; because, as there was no audible bubbling of the emergent gas, there consequently existed no means for knowing whether the gas was or was not being given off. The retort, I understand, was made of very strong wrought iron, being of a conical shape, with a rounded bottom, but, alas! it had *no safety valve* or other means by which the pressure upon it might be relieved when it had attained an abnormal degree of strength. When the accident is viewed in the light of the foregoing facts it is not difficult to account for it The moral is obvious to all who prepare oxygen, and need not here be mentioned.

No one can have perused the report of the last meeting of the Bristol and West of England Amateur Photographic Association without feeling admiration for the enterprise displayed by that band of black-fingered brothers in starting a journal of their own, in order that "full accounts of meetings, &c.," may be supplied to their corresponding and other members who are debarred from attending the meetings of the Society. As one of the public, and one who reads the transactions of all the societies, I perused this announcement with a certain feeling of regret, inasmuch as by this step I and the other readers of this Journal will have to bid goodbye to the Bristol Society, whose transactions will henceforth be a sealed book to all but its own members. But—from a patriotic point of view—is such exclusiveness wise? Would it not be better for that Society to publish their transactions as heretofore, or at anyrate in such a form as to make them open to the public? One would imagine, however, that the funds of the Bristolians must be in a most flourishing condition to enable them to indulge in the costly luxury of issuing a journal of their own proceedings. Its cost to the members must be nearly, if not altogether, in the same ratio with the gardening operations of the suburban Cockney who, when complimented on his peas by a Sunday-dinner visiting friend, replied cynically—"The peas ought to be good, for they were grown in my own garden, and I calculate that they have cost me at least sixpence each pod." Query: may not the Bristol Society's proposed journal be like the peas of our Cockney friend? and may not societies, like amateur gardeners, consult their pecuniary interests by purchasing their photographic "peas" from the market gardener? I know something about the expenses incurred in conducting the affairs of societies, and I should be sorry to see such an estimable brotherhood as that of Bristol running their heads against a stone wall.*

(To be continued.)

RETOUCHING.

The periodical display of photographs at the Exhibition of the Photographic Society of Great Britain in Pall Mall once more draws attention to the expediency of retouching. One regulation with regard to this Exhibition was that "coloured pictures would not be admitted." The question now suggests itself—What is a coloured picture? Is a slight framework of photography nearly, if not entirely, covered with pigment a coloured picture? And is a picture almost entirely consisting of hand work a photograph? An answer to these two questions is much needed, and relatively to them I will make a few remarks.

Untouched photographic portraits and figure subjects have for many years almost ceased to exist, so far as the principal portraitists are concerned; and those who do not practise it do so from motives of economy, and not because they consider it detrimental to the artistic qualities of the picture. I think I may safely assert that there is rarely—very rarely, indeed—a portrait taken that cannot be considerably improved by judicious retouching upon either the negative or print. That it is carried to a pernicious and ridiculous extent in some instances is patent to all. Still, it is evident from the popularity retouching has acquired that the public will never be again contented with the old style of untouched picture.

Retouching does not do away with the necessity for good photography as some assert, neither will a bad photograph become a good one by any amount of retouching; but, unless the picture under examination is a flagrant and bungling example, it is impossible to tell how much hand work has been applied, or which is retouching and which is genuine photography, without spoiling the picture to ascertain, and, also, having the negative to examine in the same condition it was when printed from.

These considerations show that any judgment upon the technical qualities of the photograph must be more or less of an unsatisfactory nature, and depending entirely on the skill of the retoucher to assimilate the character of his work with that of the genuine photograph. That portraits and figure subjects are especially improved by judicious hand labour nobody questions, and there is no doubt that landscape work can be likewise improved by the same means. But, here's the rub—How much supplementary hand work shall be allowed? and where is the line to be drawn?

That we should return to the old times of silver printing, when a positive was made just as it would come without other precautions than putting it in a press and exposing for a sufficient time to the light, is out of the question, although this purity of photography is not without its advocates. If it be desirable that any statements

* Our "Peripatetic" friend has, no doubt, "in his mind's eye" the fact that The British Journal of Photography was the outcome of a private adventure somewhat similar in character to the one to which he refers, and possibly behind his expressions of regret at the prospect of the reports of the proceedings of the Bristol and West of England Amateur Photographic Association being in future confined to its own members may lurk a half-formed fear lest the prosperity of the old Journal, in whose columns his *nom de plume* has long been familiarly known, should be jeopardised thereby. We are not selfish enough to deny the right of any one to commence such a journal; but, even if we were, Mr. "Peripatetic" may calm his fears. The Bristol proceedings will continue to be reported as usual in our columns, the new journal being merely a supplementary arrangement for the convenience of members, and as it will be printed at the office of this Journal neither public nor private interests will be at all interfered with, as our friend fears.—Eds.

respecting this matter should be made by an exhibitor, well and good. It is also desirable that pictures sent for exhibition, if described at all, should not be described in misleading terms—assuming to be what they really are not according to the interpretation accepted by both photographers and the public, trusting that the difficulty of discovery will palm off the imposition. Instantaneous pictures, for instance, are throughout the world understood to mean pictures taken *at once* with extreme rapidity, and *not* a picture made from *several* negatives and the free use of brush or pencil. This exemplifies exactly what I mean, and such pictures are, unless exhibited for what they are, not calculated to increase the estimation the public have for either photographers or photography. At anyrate, the matter of retouching in all its phases should be better understood than it seems to be at the present time by all who interest themselves in photographic work in its integrity.

EDWARD DUNMORE.

THE REACTIONS OF CHROMIC ACID AND CHROMATES UPON SUBSTANCES OF ORGANIC ORIGIN, CONSIDERED WITH REFERENCE TO THEIR USES IN PHOTOGRAPHY.*

THE BEHAVIOUR OF BICHROMATED GELATINE WHEN EXPOSED TO LIGHT.

THE behaviour of a mixture of bichromate of potassium and gelatine when exposed to light varies according to whether the exposure takes place in a dry condition or in aqueous solution. The aqueous solution of the glue and bichromate of potassium only begins to turn brown after an exposure that has lasted for days, and the mixture becomes browner and browner without developing any gas. The action proceeds very slowly. Light also acts slowly upon the bichromated gelatine which has stiffened; still the gelatinous mixture is already much more sensitive than the solution. Indeed, Woodbury at first used to expose such still moist bichromated films when preparing printing plates,[1] but their slight degree of sensitiveness induced him later to allow the films to dry first and then to expose.[2]

When it has set in, however, the action of the light is not externally visible for a long time. If a plate be coated with bichromated gelatine and, after being allowed to stiffen, be exposed to the direct rays of the sun, the lighted parts will have become insoluble in warm water. After a longer exposure the light turns the mixture brown and the insolubility will have become still greater. Roderigues[3] works with the bichromated gelatine, as long as it remains fluid, by daylight, and only takes the sensitised photolithographic paper into the dark room when it has stiffened. Vidal,[4] Liesegang,[5] Gentile,[6] Braun,[7] Lambert[8] bichromate their carbon tissue (slightly damped) without injury by daylight, and only carefully shut the chemically-actinic light out when the tissue is dry and its sensibility thereby materially increased.

Air-dried bichromated gelatines become brown with very unequal rapidity. When exposed for a few minutes to clear daylight they become brown, and by a longer exposure they are changed to a brownish-black. If exposed bichromated gelatine be digested in water of from 15° to 20° C. a good deal of undecomposed potassic bichromate will be sucked out. If the time of exposure be short the gelatine will become almost colourless by long steeping in water and will slowly swell up; if the exposure be long the gelatine will no longer swell in cold water, and will remain of a slightly-brownish colour. Hot water only dissolves the undecomposed gelatine, but it also swells up and partially softens the lighted parts. After a very long exposure the bichromated gelatine will have become indifferent to either hot or cold water.

With regard to the duration of the exposure required for the production of a photographic picture I do not feel called upon to say much, as the proportions vary so greatly according to the plan and object of the various methods employed. Generally, however, the light acts more rapidly the more bichromate the gelatine contains. A chrome-gelatine film which contains ten parts of potassic bichromate to 100 parts of gelatine must be exposed nearly twice as long, in order to produce by the photometer scale the same degree of density of image as chrome gelatine which contains thirty parts of bichromate. Carbon tissues behave in a similar manner. Tissue sensitised upon a two-per-cent. potassic bichromate solution must be exposed nearly twice as long as one prepared with a four-per-cent. solution. According to Monckhoven[9] a tissue sensitised upon a half-per-cent. bichromate

* Continued from page 462.

[1] *Photographische Correspondenz*, vol. iii., p 74.

[2] *Photographische Correspondenz*, vol. iv., p. 14.

[3] *La Section Photographique et Artistique*, 1878, p. 37.

[4] *Photographie au Charbon*, 1877, p. 4.

[5] *Notes Photographiques*, Paris, 1878, p. 59.

[6] *Photographic News*, 1877, p. 209.

[7] *Ibid*, 1877, p. 125.

[8] *Ibid*, 1877, p. 85.

[9] *Photographisches Archiv*, vol. xvii., page 20.

solution requires three times as long an exposure as one sensitised upon a three-per-cent. solution. According to Vidal[1] tissue sensitised upon a five-per-cent. bichromate bath must be exposed three times as long as one sensitised upon a six-per-cent. bath. According to Liesegang[2] tissue sensitised upon a five-per-cent. bath requires an exposure of two photometric degrees, while one sensitised on a two-per-cent. bath requires three photometric degrees.

Fontaine[3] was the first to remark the great sensibility to light of the mixture of potassic bichromate with organic substances as contrasted with that of chloride of silver paper. This superior sensibility was, however, formerly greatly exaggerated. Thus, I consider Geymet's[4] directions, that dry bichromated gelatine should only be exposed to the light of a candle and not to gaslight, err in the direction of superfluous caution; still carbon tissue sensitised with potassic bichromate is at least as sensitive as chloride of silver paper. Generally speaking the latter requires three times as long an exposure as the former. The observation that carbon tissue only requires a third of the exposure of silver paper has been utilised by Boivin[5] as a means of determining the length of exposure required for a carbon print in cases where no photometer is at hand. On this point there is no considerable difference of opinion amongst the authorities on the subject. Liesegang[6] says carbon tissue is twice as sensitive as silvered albumenised paper; that is, an albumenised picture must be printed until the twelfth degree of the photometer is visible—a carbon picture only to the sixth degree. It is also often three times[7] as sensitive. According to Jeanrenaud[8], Edwards,[9] and Robinson,[10] bichromated gelatine is four times as sensitive as chloride of silver paper; according to others it is six times as sensitive,[11] and according to Davanne[12] it is from five to six times as sensitive, while Swan[13] and Vogel[14] say it is only three times as sensitive; but, according to Baden Pritchard[15], if a silver print requires to be printed until the twelfth degree of the photometer be reached the carbon print will only require to reach the sixth degree. On these proportions the quality of the tissue has of course a very great influence. Indeed the sensitiveness varies by about one-half according to the variety of the paper. Braun's tissues are, for example, rather less sensitive than the Autotype Company's.[16] The proportion of the colouring matter contained in the gelatine has also a considerable influence upon the sensitiveness of the carbon tissue. Tissues which contain little pigment require about twice as long an exposure as those rich in pigment.[17] The medium is gelatine containing ten per cent of its weight of indian-ink or other colouring matter.

Of course, the duration of the exposure in the sun differs from that in the shadow. My attention was called to this point by observing that on a cloudless day in June lichtdruck plates only required a quarter of the exposure in the sun that they did in the shade. When in November I tried to use the figures giving the time of exposure as fixed in June, I found that with a quarter of the exposure required in the shade all the details were not brought out in those printed in the sun, and that at that season the exposure in the latter required to be increased to about a half of that in the former. Photographers generally say that one should print from three to four times as long in the sun as in the shade. Husnik[18] exposes his lichtdruck plates a quarter-of-an-hour in the sun and three-quarters in the shade. Geymet[19] exposes his chrome plates, for the "dusting-on" process, two minutes in the sun and from five to six in the shade, and his photolithographic paper a quarter-of-a-minute in the sun and from ten to fifteen minutes in the shade[20]. Geymet and Alker[21] expose chromated gelatine for photogalvanography from half-an-hour to an hour in the sun, and from two to four hours in the shade; while they expose chromated gum, for enamel photographs, from twenty to thirty seconds in the sun, and by diffused daylight (with a bright sky at midday) from three to four minutes[22]. Lallemand[23] exposes carbon pictures one minute in the

[1] *Photographische Monatsblätter*, vol., ii., page 363.

[2] *Photographische Archiv*, vol xiii., page 164.

[3] Bollmann, *Darstellung der Kohlebilder*, 1862, p. 38.

[4] *Photolithographic Traits et Demi-Teintes*, Paris, 1873, p. 113.

[5] *Photographische Correspondenz*, vol. xii., p. 128.

[6] *Photographisches Archiv*, vol. xiii., p. 161.

[7] *Ibid*, vol. xvii., p. 18.

[8] *Ibid*, vol. ix., p. 67.

[9] *Ibid*, vol x., p. 10.

[10] Horn, *Phot. Jour.*, vol. xi., p. 79.

[11] *Photo. Archiv*, vol. vii., p. 270. Rowell, *Ibid*, vol. viii., p. 289.

[12] *Progrès de la Photographie*, Paris, 1877, p. 119.

[13] *Photo. Archiv*, vol. viii., p. 246.

[14] *Pigment verfahren*, 1877, p. 7.

[15] *Photo. News*, 1872, p. 91.

[16] Düby, *Photographische Wochenblatt*, Nov., 1877. See also Vogel, *Photo Mittheilungen*, vol. xii., p. 257; and Siegwart, *Photo. Archiv*, vol. ix., p. 258.

[17] Edwards, *Photo. Archiv*, vol. x., p. 195.

[18] *Photographische Correspondenz*, vol. xii., page 193.

[19] *Photographisches Archiv*, vol. xiii., page 254.

[20] *Ibid*, vol. xiv., page 153.

[21] *Ibid*, vol. xi., page 255.

[22] Geymet and Alker. *Emaux Photographiques*. Paris, p. 33.

[23] *Photographisches Archiv*, vol. viii., p. 348.

sun and five minutes in the shade. Despaquis[1] exposes rubber dusting-on plates thirty to forty seconds in the sun and three to fifteen minutes in the shade. Waterhouse[2] exposes chromated photolithographic paper from half-a-minute to a minute in the sun and ten minutes in the shade. Woodbury[3] exposes gelatine plates, for photogalvanography, from half-an-hour to an hour in the sun and from two to four hours in the shade. Rodrigues[4] exposes three times as long in the shade as in the sun, where he exposes chromated gelatine from five to twelve minutes.

As to the variations of the duration of exposure caused by the time of day, the season of the year, and the special requirements of the negative, Laurent[5] expresses himself authoritatively.

In order to have a reliable starting-point for the comparison of the chemical intensity of the light at the various seasons of the year in the sun and in the shade I have made use of the data collated for Vienna and all places of the same latitude, and calculated with such unsurpassable care and exactitude by Holetschek[6]. From his tables we find that at midday in June only a quarter of the exposure necessary in the shade is required in the sun; while at eight o'clock in the morning or four in the afternoon it is necessary to expose half as long in the sun as in the shade. In January the time of exposure in the sun is somewhat more than half of that required in the shade; while at ten in the morning and two in the afternoon the exposure in the sun requires to be nearly as long as in the shade, so weak does the chemical action of the direct sunlight become during that month.

From Holetschek's tables of the intensity of light we gather also the following interesting facts:—In the months of November, December, January, and February we must expose from one and a-half to twice as long in the shade as in the sun; in March and April thrice; in June, July, and August about four times; and in September and October from twice to thrice. These figures will explain my former remarks regarding the length of exposure in June and October. In this case it is both interesting and gratifying to find the astronomer and natural philosopher, quite irrespective of photographic experience, determining the proper time of exposure to be exactly the same as that which is found to be the best in practice; and, on the other hand, this result is a good confirmation of the exactitude of the empirical experiments of the photographer. By means of the numbers given in these tables one can easily reconcile the apparent differences in the opinions cited above with reference to the proper length of the exposure.

In passing I would mention that electric[7] light has only a quarter of the actinic power of sunlight; and that light produced by from forty to fifty large Bunsen's elements is four or five times less than that of the unclouded sun.[8] Electric light is rather extensively used at Lisbon, by Rodrigues,[9] for lighting chromated gelatines for photolithography and heliography, by Winter, of Vienna, for enlarging, and by Vanderweyde[10] for taking portraits. For all three purposes Gramme's or Siemens's electro-magnetic machines are especially adapted.

Magnesium light is much weaker. According to Bunsen's calculations the photochemical intensity of light obtained by the burning of one decigramme of magnesium per minute is about thirty-six times weaker than that of sunlight. It may, however, be increased by about one-third[11] by burning zinc wire along with the magnesium. Magnesium light is used, with an exposure of two minutes,[12] in making enlarged photographs.

These deductions as to the variations of the time of exposure required in sunlight and in diffused light have nothing to do with the phenomenon that carbon tissue requires to be *proportionately* longer exposed in the sun than in the shade; that is to say, a negative must be printed until the fifth degree of the photometer shows in the sun, when in the shade the fourth degree suffices. This fact is authenticated by Liesegang,[13] Honikel,[14] and Stefanowski,[15] while Monckhoven[16] supports quite the opposite view. I believe this phenomenon to be analogous to the purer and harder printing of silver paper under a thin negative in the sun, when by diffused light less contrast is obtained. It appears as if with films difficult to penetrate the same quantity of light, if I may so express myself, produces a greater effect when its action is slow than by a short and "concentrated" action. Perhaps also the so-called "after action" of the exposure comes into play. J. M. EDER, M.D.

(To be continued.)

[1] *Photographisches Archiv*, vol. ix., p. 25.
[2] *Ibid*, vol. ix., p. 254.
[3] *Ibid*, vol. xi., p. 255.
[4] *La Section Photographique*, 1877, p. 37.
[5] *Bull. Soc. Franc. Phot.*, 1876, p. 132.
[6] *Photographische Correspondenz*, vol. xiv., p. 61.
[7] Woodbury, *Photo. Correspondenz*, vol. vii., p. 212.
[8] Benecke, *Die Photographicals Hilfsmittel Mikroskopischen Fors-chungen*, 1868.
[9] *La Section Photographique et Artistique*, Lisbon, 1877, p. 21.
[10] Düby, *Photographische Wochenschrift*, vol. iv., p 22.
[11] Benecke, *Die Photographie als Hilfsmitteletc*, 1868, p. 39.
[12] *Photographic News*, 1873, p. 68. Also Phipson, *Horn's Photographic Journal*, vol. xxiii, p. 57; *Ibid*, vol. xxi, p. 25, and *Photographische Archiv*, vol. x, p. 264.
[13] *Kohledruck*, 6th ed., 1877, p. 67.
[14] *Photographisches Archiv*, vol. xvii., p. 75.
[15] *Photographische Correspondenz*, vol. xiv., p. 208.
[16] *Kohle Photographie*, 1876, p. 41.

NOTES FROM THE NORTH.

"TRY the spirits" is often good advice in more senses than one. An example of the necessity for looking after the purity of alcohol recently came under my observation, which emulsion workers will do well to "make a note of." The operator in whose hands the incident occurred has had considerable experience with almost all the varieties of emulsions that have been introduced, but for real work prefers to stick to nearly the original formula, eschewing all acids and chlorides; and by simply adjusting the emulsion some twenty-four hours after it has been prepared, so as to have the faintest possible trace of bromide in excess, gets plates of absolute certainty, and sufficiently sensitive for most practical purposes. With the intention of preparing a supply of plates sufficient to last over the winter months, and having faith in the almost indefinite keeping qualities of the emulsion, he resolved to make a more than usually large batch; but, to make sure that all the material was in perfect order, he proceeded to prepare a small experimental quantity of two ounces. This, on being tested by practical work, proved to be of excellent quality, and in perfect confidence that the stock would "conform to sample," the emulsification of several pints was proceeded with.

The supply of alcohol being short, a fresh Winchester quart was opened, but, having been drawn from the same source as that which had been employed in the experimental quantity, no difference in result was apprehended on that score. On heating the silver and a portion of the alcohol together in a small flask a more than usual darkening of the solution was noticed; but, as the operation was conducted in the feeble, non-actinic light of the dark room, it did not attract the attention which the result showed it deserved. The emulsion having been made it was allowed to stand for twenty-four hours, and then a few drops were poured into a two-ounce measure and caused to flow around the sides till it had set. About a drachm of distilled water was then added, the film scraped into this with an ivory spatula, and the whole stirred together sufficiently long to ensure complete solution of any soluble salts. The proportion of silver and bromide had been such as should have left a slight excess of the former; but on testing the solution with potassium bromide no evidence of such excess appeared, and, on adding a solution of silver to another portion of the liquid, there was ample evidence of a large excess of bromide. At this stage a plate was coated with the emulsion, but, instead of the usual ruby colour by transmitted light, it proved to be a pretty deep primrose; and although subsequently exposed to bright diffused light for a whole day the colour by reflected light was not perceptibly altered. Additional supplies of silver were added from time to time, with the usual testing after each addition; but it was not till an excess of three grains per ounce had been used that the bromide was decomposed, and the emulsion tests indicated neutrality. Bromised collodion was then added, so as to give an excess of about one-twentieth of a grain per ounce, and a plate coated with the corrected emulsion. The ruby colour was now very decided, although of a purpler shade than usual, and the film darkened rapidly when exposed to diffused light. So far all was apparently well, but a hitch soon followed in the impossibility of getting an image either on the moist or dried and preserved film free from fog. Plate after plate was exposed for various lengths of time and developed with increasing doses of bromide, and the emulsion was found to be extremely sensitive; but in every case the result was a feeble image that fogged all over whenever the slightest attempt to obtain density was made. Acids, chlorides, and additional bromide were tried in succession, with this result—that they each and all simply decreased the sensitiveness without removing the fogging tendency.

The loss of the emulsion and consequent disappointment in not getting the desired work accomplished was bad enough; but the feeling that such a mistake might at any time occur unless the cause could be traced was worse, and so a search for that cause was at once commenced, and fortunately it was not difficult to find. The recollection of the peculiar darkening of the alcoholic solution of silver suggested an examination of the alcohol, and on bringing the flask in which it had been heated to the light a large portion of the interior surface was found to be coated with a brilliant deposit of metallic silver—a deposit which, under the circumstances, could not have been produced by the reducing action of pure alcohol. The alcohol, on examination, smelt strongly of aldehyde, and the usual tests gave unmistakable evidence of the presence of a considerable quantity of that body. How it came there I cannot venture to guess, but it was sent to the place from whence it came, and exchanged for a sample that behaves in every way satisfactorily.

The obvious lesson that this "note" is intended to teach emulsion workers is that they should "try the spirits;" and I may add that, for all practical purposes, the boiling in a test tube of a few crystals of silver nitrate in a drachm of the sample to be examined will be sufficient. If the solution simply slightly darkens in colour without producing a deposit it may be considered perfectly safe; but in the event of a precipitate appearing—and especially if any portion of the inside of the tube be coated with a mirror-like film of silver—it should be unhesitatingly rejected.

Of the many devices that have been adopted for the purpose of securing the attention of sitters—especially the juvenile portion of the photographer's *clientèle*—there are none more likely to be so successful, or that are nearly so amusing, as one I saw in operation a few days ago in a studio within a few miles of Edinburgh. The artist in question is so situated locally that he can hardly expect much patronage during the winter months, and, like a wise man, under the circumstances he has "two strings to his bow," the second being that of a professional public entertainer. His *rôle* is that of a ventriloquist, and a very clever illusionist he is. His "properties," of which a large trunkful stand in a corner of the studio, consist of numerous figures, representatives of various ages and both sexes, and some simple heads, most of which are capable of certain motions being produced by the pulling of a string or pressing a spring. The one I saw in use was a head representing that of an old man. It was simply stuck on a pole or standard, and an animated and highly-amusing conversation kept up between it and the photographer, the result being so to rivet the attention of the little sitter that, although it was a dull, rainy day, a really excellent negative was obtained.

Of course every photographer is not a ventriloquist, but I have no doubt a good many possess the power without being aware of it; and I am under the impression that anyone with a flexible voice and half-an-hour's practice would be able to both astonish and amuse his little visitors. Ventriloquism, as I have seen it practised, seems to be simply a matter of *suggestion*. The human ear is not able to distinguish the exact point from which a sound proceeds, unless the mind is by some of the other senses directed to it. In the case of a speaker the eye of the listener does this; but if the speaker can change his voice, reduce the motion of his lips to a minimum, and at the same time direct the attention of the listener to the moving lips of such a figure as ventriloquists are in the habit of employing, the suggestion is at once taken up, and through the influence of the eye the listener is effectually deceived.

Assuming this explanation to be correct, it will be evident that there are few who could not by a little practice attain to a certain degree of proficiency in the art; and, judging from the effect produced in the case alluded to, I think all who experience trouble in photographing children should give it a fair trial. John Nicol, Ph.D.

PHYSICS IN PHOTOGRAPHY.*

These last experiments were remarkable in another point of view, as they opened out the question as to whether the salts of silver might not prove sensitive to rays to which they had been supposed hitherto to be insensitive. Silver iodide, for instance, when exposed to the spectrum in a solution of potassium sulphite, proved sensitive as far as *a* of the spectrum instead of stopping short at the point indicated in *fig* 2 (page 450); and silver bromide in the molecular grouping which absorbed the red proved sensitive to a wave length of somewhere near 11,000, whereas in its normal state 9,600 was its limit.

Similarly silver chloride proved sensitive to an extent which presumably may be increased till it is equal to that of the bromide. In both these instances we have a proof that the compound was sensitive to these abnormal rays, and that the image formed by those rays was destroyed as soon as formed by their oxidising action, giving an undevelopable form of salt. It may be remarked that, by exposing films in reducing solutions—such as ferrous sulphate and pyrogallic acid rendered very slightly alkaline—an image can be developed as fast as it is formed.

The natural outcome of the experiments on the oxidation of the photographic image just narrated is that it should lead to the solution of the problem of photography in natural colours, such as that of Becquerel, Niepce de St. Victor, and others. In the fourth edition of Hunt's *Handbook of Photography* we read, at page 161, "Niepce de St. Victor has made many experiments to produce the colours upon salts of silver and copper spread upon paper, but without success; the metallic plate appears absolutely necessary, and the purer the silver the more perfect and intense is the impression." The following is recommended as the most effectual mode of manipulating:—"The plate is highly polished with tripoli powder and ammonia; being perfectly cleaned, it is connected with the battery and plunged into the bath prepared in any of the ways stated. [The baths were made from ferric chloride, cupric chloride, hydrochloric acid, &c.] It is allowed to remain in the bath for some minutes, taken from it, washed in a large quantity of water, and dried over a spirit lamp. The surface thus produced is of a dull, neutral tint, often almost black; the sensibility of the plate appears to be increased *by the action of heat*, and, when brought by the spirit lamp to the cerise red, it is in its most sensitive state. The sensibility, however, of the plates is low—*two or three hours* being required to produce a decided effect in the camera obscura. . . . These, when I first saw them, were perfectly coloured in correspondence with the drawings of which they were copies; but the colours soon faded, and it does not appear as yet that any successful mode of fixing the colours has been discovered." The coloured spectra which Becquerel photographed were produced in a somewhat similar way, the variation from which need scarcely be repeated.

In Hunt's work we also find that natural colouration of photographs was found to be possible by one or two other processes, but that the above gave the most satisfactory results. Mr. Simpson also noticed, when using an emulsion of silver chloride, and after exposing the film to white light so as to tint the surface with a lavender colour, that he was able to reproduce on the film the tint of different-coloured glasses to which such a surface might be exposed.

It will be noticed that the coloured spectra were produced on a dark compound of silver, which gradually reproduced the colour falling on it. We have first a case of total or nearly total absorption of all the rays, and a subsequent production of compounds of varying tints. In order to produce any variations of colour it is only necessary that we should have at the most three molecular groupings—one of which should absorb the blue and green, another the green and red, and the last the red and blue. Whether the number of groupings may be reduced to two is a question for future consideration. In Lockyer's note read before the Royal Society on June 11, 1874, *On the Evidence of Variation in Molecular Structure*, we find statements which might have been conceived to be almost too bold at the time when they were made, but which subsequent investigations seem to prove to be exact. In this note he refers to definite molecular groupings of compounds and the absorption caused by them, and indicates that we may have a group which will absorb at the blue end and another which will absorb at the red end of the visible spectrum. It has already been shown that the silver bromide can be reduced to two groupings—one absorbing the blue and the other the red, and it is somewhat remarkable that, by applying pressure to the latter molecular grouping, it is gradually resolved into the former grouping, and passes through all tints of the spectrum between the blue and the red. It must be remembered that these colours are not the colours of thin plates, but are totally independent of the thickness of the film so long as light can penetrate through it. It is not too much to assume that, if silver bromide can be made to group itself into these two states, that the sub-bromide when oxidised should also assume a similar molecular condition. With this compound in a state which practically absorbs all rays, it is easy to imagine that particular sets of vibrations may cause it to resolve itself into groupings which answer to them. We have, in fact, the inverse of the reduction of the silver bromide by different portions of the spectrum. It is found that one molecular grouping can be reduced by a whole series of vibrations; thus the blue-absorbing molecular group is altered by all the radiations from the ultra-violet to the yellow, and the red-absorbing molecular group by the radiations from the ultra-red to the green. If there were a green absorbing molecular group, of which there is a strong suspicion of the existence, it would probably be altered by radiations from the blue to the orange. If, then, one silver compound can exist in two or three states of molecular grouping, it is quite within the range of reason that the oxidised compound should exist in the same three groupings. The black compound to which we have already referred, in fact, does arrange itself thus, probably by a rearrangement of molecules, as formed when it absorbs oxygen. If a plate be prepared in a similar manner to that described above, and if it be exposed in an oxidising medium, these groupings are attained rapidly, a few minutes sufficing where previously hours were required. The images thus formed, however, appear not to be unchangeable, as exposure to white light, or to any colour except that in which the rearrangement takes place, causes the colour to fade. The feat of producing *permanent* photographs in natural colours is as yet unsolved, but it may not be so far distant as might be imagined. In order to obtain them it is necessary that a method should be found by which the molecular groupings of metallic silver can be formed in either of the two (or three) states already described. As is well known, the absorption by metallic silver in a thin film takes place entirely in the red end of the spectrum; but it is a fact well known to photographers at large that in certain processes it is perfectly feasible to obtain silver in which the transmitted light is of a pink red colour, whilst tints varying from indigo, passing through olive-green to rich brown, are familiar. In order to obtain permanent photographs in natural colours, the object to be sought is a method by which the sensitive silver compound may be reduced by the red rays to a molecular grouping, which on development (probably by the alkaline method) shall be grouped into the red-transmitting molecular grouping, and so on. When this is discovered, the leap between monochromatic pictures and chromatic will have been taken, and the once apparent improbability have become more than a possibility.

We have finally to return to the subject of photography with the light of those rays which are usually inactive upon sensitive salts, and at which we have already glanced.

To Dr. H. Vogel, of Berlin, is undoubtedly due the new interest which has been taken in this branch of photography. Towards the end of the year 1873 he announced that he had discovered a method of making the non-actinic rays in certain circumstances actinic. We quote his own words*:—"I have found that bodies which absorb the yellow ray of the spectrum make bromide of silver sensitive to the yellow ray. In like manner I find bodies which absorb the red ray of the spectrum make bromide of silver sensitive to the red rays. For example, by the addition of *corallin*—which absorbs the yellow ray—to a bromide of silver film it becomes as sensitive to the yellow ray as to the blue ray." In articles which he published at various times he enlarged on

* Concluded from page 450.

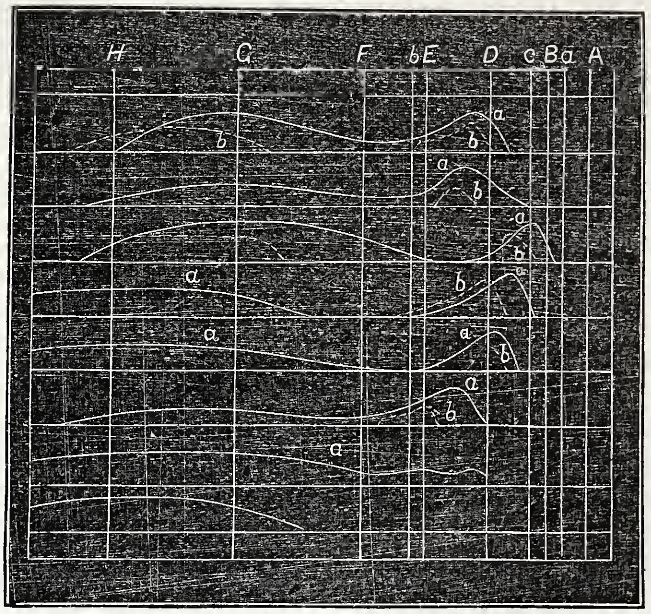
* *Photographic News*, December 5, 1873.

this idea, some of his most striking experiments being conducted with aniline dyes of various kinds. He and Waterhouse have shown that a silver bromide film becomes sensitive to the part of the spectrum which certain of those dyes absorb, whether the absorption be due to a compound formed between the dye and silver or to aqueous or alcoholic solutions. This at once opened out a large field for inquiry, and made research in this direction doubly interesting, owing to the fact that apparently certain physical laws would have to be modified if Vogel's theory were correct. He divided the action of the substances so added into two. The dye he called an "optical sensitiser" for that particular part of the spectrum which it absorbed, whilst bodies which absorbed the halogen (thrown off by the reduction of the molecule) he called a "chemical sensitiser," and a combination of both properties in a dye made the film sensitive to the absorbed rays. The theory of the optical sensitiser seemed to clash with the received notion of molecular motion; but before analysing the results the accompanying figure should be studied, which is taken from Vogel's work on photography (*fig.* 5).

which the further reduced silver shall occupy, and thus the image is built up. When there is an excess of soluble bromide in the film the developing action will be retarded. This series of experiments seems, then, to indicate that there is no need for optical sensitisers to alter the oscillation of the molecules or molecular groups, but that, in some instances, the same theory may be applied to the action of dyes as may be applied to the deposition of metallic silver on a glass plate which has not been freed from "dirt"—a disagreeable phase which is well known to photographers at large. The explanation of the diagram is, therefore, not hard to understand when viewed in this light. The theory of rendering the silver salt sensitive to the red has already been explained, and the same explanation is naturally applicable to those dyes which, when brought in contact with silver, form a definite compound with it.

There are many interesting physical researches which spring out of these various experiments, amongst which may be mentioned a method of determining the size of atoms and their arrangement in the molecule; and last, and not least, the production of permanent photographs

FIG. 5.



Effect of the solar spectrum on silver bromide stained with—

I. Naphthaline red.

II. Fuchsin.

III. Aldehyde green.

IV. Cyanine blue.

V. Methyl violet.

VI. Eosine.

VII. Carmine.

VIII. Effect on unstained silver bromide.

The curves marked *a* show longer exposure than those marked *b*.

Let us take one or two examples from the above figures and see whether they agree with Vogel's assumption. We will take VIII. as a standard of comparison, being the effect on unstained bromide, and this will be fair (though it does not take the form given, shown in *fig.* 2, page 450), as it is presumed that this sample of bromide was worked with throughout. Comparing say IV. with VIII. we see that in the blue the sensitiveness, as shown by the ordinate of the curved line, is very similar, but that the action is got in the yellow. In examining cyanine blue, the dye used, we find that the absorption takes place just at that part of the spectrum. Similarly examining V. and VI. we arrive at the same results, and in fact the absorption of the rays invariably corresponds with the photographic action.

It will be seen, then, that without doubt the principle Vogel contends for might explain the phenomena. He, however, found that if the silver bromide film had been prepared with an excess of bromide the actions indicated did not take place. This seemed to indicate a weak spot in the theory, and it pointed at first sight to the idea that it was necessary to form a coloured compound of the dye with silver in order to render it sensitive. In the majority of cases this still seems to be, if not a necessity, yet a cause of increase of sensitiveness to the region of the spectrum absorbed. Vogel, however, shows that if the silver bromide film, prepared with an excess of bromide, be washed, and be then treated with a dye and a chemical sensitiser, such as tannin, the same action takes place. The theory of a silver compound in this case must evidently be abandoned, and would point to the correctness of Vogel's theory did not other experiments in a certain degree offer an explanation more accordant with our preconceived ideas. Let the dye be mixed with *plain* collodion and a film of it be exposed to the spectrum; it will soon be visibly evident that there is a marked effect produced by the rays absorbed. Thus cyanine blue will be found bleached in the region near D and below it. If over the dyed film of collodion thus exposed a film of silver bromide in collodion be poured in the dark, and the alkaline developer be applied gradually, a silver image of the altered portion of the dyed collodion film will make its appearance, although the film of silver bromide has received no impression by light. The explanation of this remarkable phenomenon is to be found in the theory of alkaline development already given in these articles. The reduced dye acts as a nucleus on which the metallic silver will first adhere, and this first reduction of metallic silver determines the position

painted in natural colours by light itself. The attempts made of late to form photographs in proper colours by taking distinct negatives through blue, through green, and through red media, and then printing positives from such, and finally obtaining red, green, and blue prints, and superimposing them, is not a step in a scientific direction, since it is utterly impossible to secure monochromatic colours which are pure enough to give the truth of nature. Such efforts, though they may be commercially valuable, yet are not to be followed with too much zeal by scientific photographers.

We may now axiomise the results we have indicated:—

1. That the undeveloped photographic image on a silver compound is formed by the reduction of that compound.
2. That the compound may exist in two (or three) molecular groupings.
3. That the compound can only be sensitive to the rays which it absorbs.
4. That the reduced silver compound may be rendered incapable of development by combining with oxygen.
5. That light of every refrangibility may cause an acceleration of oxidation provided the compound acted on absorbs such light.
6. That the oxidation of the compound reduced by any particular ray may be as rapid as the reduction, and thus to give a false idea of their limit of sensitiveness to the spectrum.
7. That the oxidation of the reduced silver compound may account for the phenomenon of photographs in natural colours hitherto produced.
8. That in all probability the action of dyes on silver bromide is a secondary one.

W. DE WIVELESLIE ABNEY, *Capt. R.E.*

OPINIONS OF THE LONDON PRESS ON THE PHOTOGRAPHIC EXHIBITION.

THE PHOTOGRAPHIC EXHIBITION.—The annual exhibition of the Photographic Society of Great Britain is now open for a short time at the Gallery of the Society of Painters in Water Colours, Pall-mall. We miss from the walls some of the most valuable contributors of former years, particularly of the class of amateurs whose legitimate success was due to their aiming at purely scientific and artistic results, without resorting to any artifice to secure a trading profit. We think the Society would act wisely by not only rendering (as already done) ineligible for a medal photographs "improved" by hand, but by limiting the works admissible in the exhibition to pure photographs from unsophisticated negatives. At all events, any "retouching" of portraits, any additions of skies to landscapes, any "combination" contrivances—in short, any falsification of the direct products of the camera from nature, taken at a single sitting, should be distinctly avowed in the catalogue. This would prevent the Exhibition from degenerating into a show-room and advertising medium for the benefit, principally, of those who are least scrupulous in the means adopted to catch the eye and flatter ignorant or perverted taste. Take, for example, the portraits. We may safely say that nearly the whole have been touched up by hand; in most cases the flesh has been stippled all over, though the touches may be almost too minute for the eye to follow. It is this "retouching" which gives the waxen hue or the woolly or puffy surface to the flesh, the insipid expression, the characterless want of detail, the glaring eyes, that render so much photographic portraiture comparatively worthless. A remarkable illustration of the truth of our remark is afforded in the present display. We allude to two photographs by Mr. G. Nesbitt, from a negative portrait of a man in slouched hat and swathed cloak, called *The Brigand.* The first (142) is "untouched," as stated in the catalogue; the other (202) has undergone the usual manipulation. In the former the eye may, it is true, lack due brilliancy. The lips may be too white, owing to the diffusion of the light on smooth surfaces in photography; the skin may appear unnaturally coarse; and freckles and the colour of the hair may be much deepened in tone, because, while photography is almost insensible to the softening, pearly tints, it greatly exaggerates in intensity the yellows and reds. Nevertheless, an artist would not hesitate for a moment in preferring the former. The difference is that between a painting by Rembrandt in his more vigorous manner and a tame, overwrought miniature. Several other portraits by Messrs. Lombardi, Slingsby, Boucher, and Lock and Whitfield possess much merit, making due deduction for the retouching; and the costume portraits of Mr. Shuter may afford suggestions to artists. Mr. Faulkner's faint portraits of children on opal glass strengthened in sepia are more frankly wrought up by hand, and are charming vignette sketches, so to speak. This operator is peculiarly happy in seizing—of course by the instantaneous process—the characteristic attitudes and gestures of his little models. It is much easier to work by the instantaneous process on a small scale, and a tiny photograph may be enlarged to nearly any dimensions, as shown in some remarkable examples exhibited by the Autotype Company. The value of the process in the rendering of animals is illustrated in contributions by Mr. H. Dixon; and in sea-studies with yachts in full sail, by Mr. P. Jennings—the latter of which have been awarded a medal. In the department of *genre* a medal has also been given to Mr. G. Nesbitt for an artistically-arranged group of a little girl fondling a dog with a "broken leg" enveloped in bandages. Another medal has been carried off by Mr. A. W. Wilson for one of an expressive series of figures illustrating Shakspeare's *Seven Ages of Man.* In landscape the exhibition is, as usual, very rich. Some views in Warwickshire, by Mr. Bedford, leave, it need hardly be said, nothing to desire. They are "not for competition," Mr. Bedford having been a member of the jury. To Mr. Vernon Heath a medal has been awarded for a series of landscapes; and there are many other admirable works in this section by Captain Abney, Messrs. H. Cooper, Pringle, &c. One of the surprises of the Exhibition is the excellence of the work turned out by the School of Military Engineering, Chatham, considering that the students can have little experience of the requirements of picturesque landscape photography. A view *Near Bettws-y-Coed* by the school has been justly awarded a medal, although there are few planes of distance to test the operator's delicacy of chemical manipulation and focal adjustment. Mr. England sends numerous illustrations of the buildings and courts of the Paris Universal Exhibition; and Mr. G. Berwick points to the applications of photography to scientific purposes in his "microphotographs." Mr. Warnerke has lent a highly-interesting series of Russian and Swedish subjects, some of them taken in the Russian state establishments. The Woodbury Company (to whom a medal has been given) exhibit samples of its highly-ingenious process of reproduction in a series of "book illustrations," which present great fidelity to the originals from which they were taken. By the side of the printed impressions are the metal blocks from which they were taken; and a fresh wonder is awakened at seeing hard metal dug into as though it were by the burin, knowing all the while that these furrows are due to pressure of a mere photographic film. The sole drawback of the process—and it is only a commercial one that is perhaps compensated for by other advantages—is that the printing is less direct than in the rapidly-improving processes of the "Eliotype," the French "photogravure," and the "autotype." A transparency of an interior taken by lamp or gaslight (of course, by means of a long exposure), exhibited by Mr. Bennett, is suggestive of the possibility of new applications of photography being found on the introduction of electrical lighting. A rule of the Society which forbids the introduction of photographs coloured by hand has not prevented some specimens of the so-called "Poikilographic process" of colouring, introduced by Lombardi and Co., from finding their way to the stairs leading to the gallery. These are simply photographic transparencies on thin prepared paper or canvas, printed in colours on the reverse, so as to show through. Artistically considered the process is almost valueless, though less objectionable than painting on the obverse, for the reason that the photograph is less obscured and falsified. It is also an advance on the "photochromie" of M. Vidal—that is to say, the application of variously-coloured films of gelatine—for the display of which a special pavilion has been provided in the Champ de Mars. But it is obviously not the slightest approach to photographing in colours: the photographers are as far off as ever from making Apollo a colourist as well as a draughtsman; and, if they were to succeed, the result would be no more a work of art than the present photograph is so, and the sun-god would be no more an artist than he now is. In the section of apparatus a medal has been awarded to Cadett's patent pneumatic shutter, devised for rapidly closing the mouth of the camera. It is more portable than the electrical apparatus for the same purpose. We may announce, in conclusion, that a competition is invited, by the dry-plate process now so much in use, for a prize of £50, offered by Mr. Joseph Paget.—*Illustrated London News.*

ON PROCESSES OF MAP PRODUCTION BY PHOTOGRAPHY.*

Photocollotype.

The great defect of all the processes of photolithography described in the last section is that they can only be applied with advantage to the reproduction of drawings or subjects in which the gradation of shade is shown by lines or dots separated by white spaces of varying sizes and at different intervals apart, as in line or stipple engravings and lithographs in line or chalk. Even such drawings, to be successfully reproduced, must be in a good, bold, open style, and have all the lines or points composing them of an equal and perfect blackness. In the many attempts that have been made to reproduce photographs from nature by photolithography or photo-engraving, or to copy paintings and brush-shaded drawings in which gradation of shade is continuous, success, only partial at best, has been secured by breaking up and destroying the continuity of gradation. By the processes of photocollotype—so called from the printing surface being of gelatine—these defects are entirely obviated, and absolutely permanent photographic prints may be produced in the printing press almost equal to silver prints in perfect delineation of detail and delicate gradation of shade, but vastly superior to them in permanence and cheapness of production.

Poitevin was the first to recognise, so early as 1855, the fact that the half-tones were better preserved on stones that had been treated with a chromated colloid mixture, if, after exposure to light under a negative, instead of being inked all over and then washed with water to remove the superfluous ink, they were first moistened and then inked in with a lithographic roller charged with printing ink.† He seems, however, to have always regarded the stone as the principal printing surface and treated it by the ordinary methods of lithography. Only a few impressions could be obtained from stones thus treated.

In 1866 MM. Tessié du Mothay and Marechal, of Metz, discovered that the stone or metal plate hitherto used as a printing surface might be replaced by a mixture of isinglass, gelatine, and gum, treated with an acid chromate, and evenly spread upon a well-polished metal surface; because if, after exposure to light under a photographic negative, such a gelatinous surface were moistened greasy ink applied upon it with a roller would adhere well to the parts of it that had been acted upon by light, and would be taken up by those parts in proportionate quantities, according to the intensity of the gradations of light and shade produced on them by the action of light, and their consequent impermeability to water. Photographic prints in fatty ink, reproducing the most delicate gradations of shade without any apparent grain or break of continuity, could thus be produced.‡

It will be seen that this process was based on exactly the same principle as Poitevin's photolithography, but differed from it in the distinct recognition of the colloid film as the printing surface. MM. Tessié du Mothay and Marechal were also the first to recognise the necessity of adding a certain proportion of acid or of oxidising or reducing agents to the chromate salt used for sensitising the gelatine, with the object of rendering the colloid surface more apt to receive the greasy ink and also of hardening the film so as to enable it to withstand the wear and tear of printing. This they did by exposing the sensitive plates to a high temperature before using, but the effect was produced in great measure by the decomposition of the chromate salts by the acids or other substances added to the colloid mixture.

MM. Tessié du Mothay and Marechal printed off their "phototype" plates in a lithographic press in much the same way as ordinary lithographs, but with certain modifications due to the peculiar nature of the printing surface. The principal of these was the use of two inks—one stiff for giving force to the shadows; the other thin for bringing out the more delicate half-tones.

The "phototype" process as at first proposed laboured under the defect of not being able to yield a large number of prints from a single plate, but, in 1869, it was improved upon in this repect by Albert, of

* Continued from page 489.

† *Traité de l'impression photographique sans sels d'argent*, p. 78.

‡ *Photo. News*, Vol. xi., p. 260.

Munich, who substituted a thick glass plate for the metal plate used by Tessié du Mothay and Marechal as a support for the colloid film. His films consisted of albumen, gelatine, and bichromate of potash alone, and he gave them the required solidity and adherence to the glass by first coating the plate with a sensitive colloid mixture containing a large proportion of albumen, and then giving the under side of this first coating a preliminary exposure to light through the glass. The second coating containing more gelatine was then applied, and, after it had dried and the photographic image had been impressed upon it, the plate was again exposed from the back, in order to thoroughly solidify and combine the under part of the compound film. The gelatine films so prepared were capable of yielding some hundreds, or even, it is said, thousands, of perfect copies. This process is still largely used by its inventor, and is known by the name of "Albertype."*

According to some authorities, MM. Ohm, Grossmann, and Gemoser, of Berlin, took out a patent, in 1867, for a method of photocollographic printing, comprising, in addition to the use of glass as the support of the gelatine film, of the double coating of the plate and of the hardening of the film by exposure of the back surface, the introduction into the sensitive gelatine mixture of certain resinous compounds dissolved in spirit, by which the gelatine film is rendered quite insoluble and admirably adapted to form a fine printing surface. It is said, on the other hand, that the credit of all these improvements is due to Albert; but, in any case, it is certain that until after the publication of Albert's process, early in 1869, Ohm and Grossmann's was almost unknown, and had not come into general use. In October, 1869, the Autotype Company in London acquired the patent, and have since worked the process with the greatest success.

About a year after the publication of Albert's method Mr. Ernest Edwards, of London, introduced, under the name of "heliotype," a very important modification of the photocollotype process. He first waxed a glass plate and then coated it with a substantial layer of gelatine and bichromate of potash, containing a small quantity of chrome alum, with the object of hardening the gelatine and rendering it insoluble without destroying its impermeability to water. When dry the gelatine film was removed from the waxed glass plate, and the side which had been next to the glass was exposed under a reversed negative in the usual way, and then, as in Albert's process, the back surface of the film was hardened by exposure to light. After this the film was attached under water to a metal plate, preferably pewter, coated with india-rubber, and squeegeed into perfect contact with it. The bichromate salt was then removed by washing, and the plate was ready to be printed in an ordinary Albion printing press.

In this process the peculiarities were the use of chrome alum for hardening the gelatine; the separation of the colloid film from its original support, by which perfect contact with the negative was secured, as well as less risk of breakage of the latter; the subsequent transference of the film to a metal plate, by which the liability to breakage of glass plates in the progress of printing was obviated; and, lastly, the substitution of vertical instead of a scraping pressure in printing, by which the gelatine films were not exposed to injury by wear and scraping of the surface.

This process is still, I believe, largely practised, and full details of it, with various improvements suggested by Capt. Abney, R.E., will be found in the latter's excellent little work, *Instruction in Photography*.

About the same time Herr Obernetter, of Munich, proposed another process of the same kind offering some peculiarities and said to produce very satisfactory results.

A sheet of glass is coated with a mixture of gelatine, albumen, sugar, and bichromate of potash, dried, and exposed to light under a negative. The plate is then dusted over with finely-powdered zinc, which attaches itself only to the parts protected from the light, and in proportion to the amount of protection they have received. The plate is then heated to about 369° F., or exposed to light till the whole surface of the film has been rendered insoluble. Before printing the plates are treated with dilute muriatic or sulphuric acid. By this operation the parts of the gelatine film covered with zinc are rendered, by the formation of hydrogen, susceptible of attracting water to a greater or less degree, while the other portions, upon which no zinc has settled, are capable of receiving a fatty ink. The printing is then proceeded with in the usual manner.†

J. WATERHOUSE, *Capt.*

(To be continued.)

FOREIGN NOTES AND NEWS.

ON THE MEANS OF DETECTING THE ADULTERATION OF WAX.—WHITE CARBON TISSUE.—DR. RICHARD'S RAPID NEGATIVE PROCESS.

The *Photographisches Wochenblatt*, from which the following is taken, in what appears to be the first of a series of articles on the adulteration of various substances used in photography, treats of the impurities mixed with wax. In adulterated wax have been found starch, flour, gypsum, pipeclay, sulphur, resin, stearine, and talc; but the most difficult of all to detect is the stearic acid, because it resembles the cerolic acid which is present in beeswax.

"Of all the methods of detecting stearic acid the most reliable is found in the different proportions in which the two acids dissolve in cold alcohol. For this purpose boil the wax to be tested for about five minutes in twenty parts of alcohol of eighty to eighty-five per cent.; then let the solution stand several minutes, after which add cold water. If the wax be pure the clear solution above the sediment at the bottom will scarcely become turbid at all; while if it contain stearic acid it will become very turbid, and white flakes will be precipitated. Resin may be detected in the same way. Starch, flour, gypsum, &c., may be found by dissolving the wax in ether or oil of turpentine, when they will fall undissolved to the bottom. Sulphur is found by boiling in a dilute solution of potassic lye with the addition of a few drops of muriatic acid, when the well-known smell of sulphuretted hydrogen will announce the presence of sulphur. A few drops of plumbic acetate will produce in the solution a brownish-black precipitate of sulphate of lead.

"An admixture of talc can only be detected with certainty by its melting point.

Pure talc melts at	from 37 to 40° C.
19 parts talc to 1 part wax melts at	47
7 " " 1 " " "	49·5
5 " " 1 " " "	52·5
3 " " 1 " " "	55·5
1 part " 1 " " "	59
1 " " 3 parts " "	60·5
1 " " 5 " " "	61·5
1 " " 7 " " "	62·5
1 " " 11 " " "	63
1 " " 19 " " "	64
Pure wax	64

This method gives, however, only the approximate value of the admixture, because when the proportion of wax is great no great variation indicates the melting point.

"More exact are the results given by the solution of the glycerine formed by the talc, because wax contains no glycerine. so that its presence in wax is a sure indication of the presence of talc. This method has, however, the disadvantage of being too difficult for inexperienced persons, and can only be properly adopted by a professional chemist. When there is a very considerable proportion of talc in the wax the latter will be soft and smeary, and the talc may be recognised by its smell, by the greasy-looking break, and, above all, by the disagreeable smoke produced when the talc containing wax is heated over live coals. When less than a fifth of the mixture is talc this method of detection is no longer to be relied upon.

"Japanese vegetable wax can almost only be recognised by its melting-point, and even this wax—which on account of its low price is used as an addition to beeswax for many purposes—often comes into the market in an adultered condition, and, according to Dr. Wimmel, the chemist, contains an addition of from fifteen to twenty per cent. of water. There is also wax which contains even thirty per cent. of water. This addition causes the wax to lose its clear, shiny, beeswax appearance, and to become matt white, coarse, and easily broken By melting the wax the water can be run off; but in what way the adulterators succeed in getting the wax to retain it is not known, as it does not form a chemical compound with it."

Herr Schierer, the editor of the Vienna *Photographische Notizen*, writes unfavourably of the result of experiments with white carbon tissue.

Dr. Richard offers for sale a rapid negative process which, he says, is based on pure chemicals, new collodion, fresh developer, and weekly examination and determination of the exact chemical strength of the negative bath. The principal novelty in his process, as far as it is known, seems to be the use of two baths to sensitise the plate. In his own words:—

"Given a glass-house measuring at least 8 metres in length, 3·5 metres in breadth, and 3·5 metres in height, quicker results will principally depend on the determination of the chemicals; therefore I use two negative baths. A and B. This idea of working with two negative baths ought to be very welcome to the photographer when working in winter or on cloudy days in spring or autumn. By doubling the negative bath, which may be regarded as the basis of the process, greatly increased density is produced.

"It is to be understood that the contents of these two baths, A and B, are not alike. When both baths are used the negative picture developes rich in detail, fire, and depth, and ladies' velvet dresses come out of the richest texture. For summer, unfortunately, both the baths A and B cannot be used, because when the temperature of the laboratory exceeds 16° R. the temperature of the second or additional silver bath cannot be used on account of fogging. Our two negative baths demand that their contents should be proportioned with the utmost accuracy, so that they may correspond. Either bath may be used alone.

"The difference which using one of the baths A or B should make to the length of the exposure is for a *carte de visite* one-third of a second, and for a cabinet one second. When both baths are used, and the same exposure is given, the detail should be richer and the image stronger.

"The contents of the negative bath should be exactly determined every week, and a bath must only be in use one day in each week (to take from fifteen to twenty persons); it should then rest until it is again determined as A or B.

"In using the rapid process I require six negative baths. With the developer it is the same. In winter I use one or other of two developers, according to the subject to be developed."

We shall leave Dr. Richard's method for his rapid negative process to speak for itself.

* *Photo. News*, vol. xiii., p 121 † *Ibid*, vol. xiii., p. 483.

Our Editorial Table.

THE MANUAL OF PHOTOGRAPHIC COLOURING, FORMING A HANDY-BOOK ON THE ART OF PAINTING ON THE PHOTOGRAPHIC IMAGE.
By JOSEPH WAKE.
London: HENRY GREENWOOD, 2, York-street, Covent Garden, W.C.

IT is in the recollection of our readers that an admirable and valuable series of practical articles on the art of painting photographs was recently published in THE BRITISH JOURNAL OF PHOTOGRAPHY. These papers were received with so much favour as to justify the author, Mr. Joseph Wake—well known as the head artist to the Autotype Company—in collating them in the form of the neat manual which is now before us. The matter has been subjected to careful revision previous to its being made to assume its present "handy" form; and we feel certain that never before was a *brochure* presented to the photographic public in which was compressed such an amount of valuable practical matter relating to the "art of painting on the photographic image"—whether in oil, water, or crayon colours—as that comprised in the sixty-two pages of Mr. Wake's *Manual*, which, like most handbooks connected with the fine arts, is issued at the exceedingly low price of one shilling.

Respecting the merits of the work we have only to say that the various directions are given in so lucid a manner as to render it valuable, both for those who desire to engage in the practice of the art of colouring as a profession and those whose requirements partake more of an amateur character. For these reasons it deserves to, and will, be extensively circulated among those who follow our "gentle art," whether as professional or amateur photographers.

Correspondence.

MR. COOPER'S EMULSION PROCESS.

To the EDITORS.

GENTLEMEN,—I have lately received so many letters asking when I intend to publish the details of an emulsion process I have worked out recently, and which gives me almost entire satisfaction, I trust you will allow me to say, through the medium of the Journal, that I hope to write a short paper on the subject in time for the meeting of the Photographic Society of Great Britain in December.

I must also crave the indulgence of several correspondents to whom I have been unable to reply privately; and I may hint to some of these that my time is too fully occupied for me to write long letters to unknown inquirers.—I am, yours, &c., HENRY COOPER.

Holmehurst, Torquay, October 28, 1878.

A NEW STUDIO.

To the EDITORS.

GENTLEMEN,—I observe in your issue of this date that Mr. Samuel Fry has, with much ingenuity, *reproduced* the "new (?) studio" described by me in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1876, page 97.

In the concluding paragraph of my article I invited photographers to inspect my studio, and many came.—I am, yours, &c., J. WERGE.

11*a*, *Berners-street, London, W.*,
October 25, 1878.

STOPPING-OUT BACKGROUNDS.—OXYGEN RETORTS.

To the EDITORS.

GENTLEMEN,—In your article in last week's issue, under the first portion of the above heading, you refer to the difficulty of obtaining straight lines in painting out backgrounds. I am happy to say I surmounted the difficulty some time since; and here is my plan, by which the most inexperienced may obtain straight lines of indefinite length:—

Procure a straight-edge of any material (I prefer vulcanite, as being light and pliable), also an ordinary drawing-pen. With these you may rule a line as fine or as coarse as you please; it is then an easy matter to paint up to the line without going over it. The points of the pen must not be too sharp, or they will cut through the film; rubbing them with a piece of rough drawing-paper will effectually remove any existing scratching propensity. I always use indian-ink with a little ox-gall as the stopping-out medium.

With reference to the melancholy death of Mr. E. J. Wrench: I imagine the retort must have been made of cast-iron. If any of your readers are possessed of such an abomination as a cast-iron retort I would strongly advise them to break it up at once, and procure one of wrought-iron instead, and for this reason—that should an explosion occur with a retort of cast-iron (cast-iron having no fibre) it will fly into pieces, any one of which may be a messenger of death. In the case of wrought-iron a "rip" would be the result, the concussion being then the only element of danger.—I am, yours, &c. H. WILKINSON.

Ashton-under-Lyne, October 28, 1878.

[Some observations on the latter subject will be found in *Notes on Passing Events* in another column.—EDS.]

THE LONDON PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—Before saying a word on the subject I desire it to be understood that I write purely for information, and that an understanding may be laid down.

I have always understood that in the class designated "landscapes," untouched, *singly-printed* work was implied, that no composition pictures were admissible, and that such pictures must be *entirely* the work of the exhibitor.

Now, anyone who has seen the exhibits at Pall Mall must be aware that in many cases the beautiful cloud negatives of Mr. Perry have been extensively used. Of course nothing could be further from "the work of the exhibitor" than this.

I shall be glad to know if in future "cloud negatives not by the same artist as the subject" may be used in exhibition work legitimately and as an understood thing.—I am, yours, &c., H. A. H. DANIEL.

Bristol, October 28, 1878.

THE MEDAL AWARDS AT THE PARIS EXHIBITION.

To the EDITORS.

GENTLEMEN,—It is well said "fools rush in where angels fear to tread;" and on this principle, it may be, am I now about to address you.

The squabble between Mr. A. L. Henderson and Mr. J. R. Sawyer respecting enamels is a small one, and may well be allowed to pass. But far otherwise is it with the very plainly-expressed innuendo in Mr. Henderson's letter, in which charges of the most serious nature are hinted against the honour of certain jurors. This is a matter which concerns every one of the photographic public, and ought to be probed to the very bottom. I am the more concerned in this because Mr. Henderson is not the only one who appears to be aware of the circumstance to which reference has been made.

Let me, as a member of the British public, take this opportunity of requesting that the English juror, Mr. England, will lose no time in stating publicly whether, in response to any request expressed on the part of either himself or his brother jurors, it is in accordance with his knowledge that pictures were delivered to any of the jurors; whether the receipt or non-receipt of such asked-for pictures influenced the decision of the jurors in regard to the awarding of gold or silver medals; and whether he is aware of the "irregularity" hinted at by Mr. Henderson in the delivery of pictures forwarded for that purpose, by which an intended award of the highest kind was commuted into one of lower grade.

These are matters which concern every photographer, and if they are shirked the public will draw their own conclusions. The character of jurors, like that of Cæsar's wife, must be above suspicion; and French jurors will thank me for affording them an opportunity for clearing themselves from a grave imputation.—I am, yours, &c.,

A BRITISH PHOTOGRAPHER.

[Although in our append to Mr. Henderson's letter, last week, we stated our opinion that there was some grave mistake in his allegations, still, as it seems possible that there may, after all, be some foundation for what has been alleged, we print this letter in order that those concerned may have an opportunity of rebutting such innuendoes if they feel so inclined.—EDS.]

MR. HENDERSON AND HIS ENAMELS.

To the EDITORS.

GENTLEMEN,—I scarcely feel constrained to reply to Mr. A. L. Henderson's letter in THE BRITISH JOURNAL OF PHOTOGRAPHY, inasmuch as, so far as I am concerned, it touches me but slightly. True, Mr. Henderson is unable to see that there was any lack of courtesy, because he asked me to inform the person who reproduced my remarks that he had been awarded a bronze medal, and that his were all untouched photographs; and then he asks, naïvely enough, "What is this but publication?" I had nothing whatever to do with the reproduction of my remarks, and do not know to this day who reproduced them. Why did not Mr. Henderson write to the journal in question himself, instead of trying to force a quarrel on me? If he thought he had a grievance that was the proper course. If he decided to write to me at all upon the subject, I say it was great want of courtesy not to state that he intended to publish the letter; but, having published his letter, why had he not the fairness to publish my reply? His question of "What is this but publication?" is as ridiculous as his slanderous innuendos against men like Davanne, Luckhardt, Frank de Villecholles, Chardon, and England.

Who, indeed, would be a juror if this sort of calumny were usual? Let anyone read the names of the jurors—men known to all Europe as men of science, as honourable men, as distinguished in their respective branches—and then say if it is not scandalous that a disappointed competitor could so far lower himself as to make such charges of corruption as Mr. Henderson has thought fit to make.

As to Mr. Henderson's impugning my judgment: that is a small matter, and not worthy of consideration. I simply said that, in my opinion, this country was far behind in enamels, and the jury seem to have been of my opinion. I had not the slightest feeling in the matter. I wrote what I considered to be the truth after a careful inspection of the enamels shown in the two sections; and Mr. Henderson is quite within his right when he differs publicly and privately from my criticism.

On my part I take the liberty to differ with Mr. Henderson when he says "what photographers require is a process that demands little or no artistic work." In my opinion, if the customers of photographers require enamels at all they would like to have them as good as they can be produced; and it is probable that the artistic treatment of the French enamels gives them that superb effect which we look for in vain amongst those exhibited in the English section.—I am, yours, &c.,

Autotype Works, Ealing Dene, W., J. R. Sawyer.
October 30, 1878.

ANSWERS TO CORRESPONDENTS.

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

R. T. H.—Apply to the print a one-grain alcoholic solution of Castile soap.

A. D. wishes to know where he can send ivory-coloured miniatures for exhibition.

An Apprentice.—Apply a strong solution of cyanide of potassium nearly saturated with iodine.

Anxious.—We shall try the formula you give, and if we obtain the gritty film spoken of shall investigate the cause.

J. R.—Thanks. The process alluded to is probably one of those of which we have frequently given details in this Journal.

J. Smith.—The writer of the letter signed "Fair Play" is well known to us, but his name is not among those of whom you send a list.

"Rubber Solution."—1. Dissolve white rubber in benzole.—2. Decomposition has set in; it will therefore be necessary to make a fresh bath.

Z. A. R. wishes to know the best method of making a ten-grain aqueous solution of chloride of palladium. He finds it to be exceedingly insoluble.

Cymbro.—Unless informed to which of M. Lambert's processes you allude we could not answer your query. Repeat the question again, and state to which process you refer.

Geo. F. D.—Remove the lens from the cell, place it in water made slightly warm, and then transfer it to water of such a temperature as to soften the balsam by which it is cemented.

F. Harrington.—The varnish you are using as a substratum will not injure the silver bath. There are other media—such as india-rubber solution or albumen—which we would prefer to it.

J. L. Leak.—Send the roller of the press to an engineer, and instruct him to repolish it. He will have to take a shaving off the surface in order to eliminate the fissures, but this will not render it less efficient.

R. Miller.—Do not attempt to doctor the toning-bath, for the brown discolouration proves in an unmistakable manner that decomposition has set in. Pour the whole contents of the bath among your wastes, and make a new one.

Semper Idem.—To produce the stereographs employ the albumen process and tone by means of gold. This will prove durable, and yield the qualities you so much desire. If you are ignorant of the process recommended, write again.

A. O. T. T.—Nothing of which we are aware answers so well as a strong solution of cyanide of potassium *nearly* saturated with iodine and thickened with mucilage of gum arabic. Let this be applied by means of a finely-pointed camel's-hair brush.

Obernetter's Paper.—In reply to a querist who, a few weeks ago, wished to know if Mr. J. Solomon were still agent for Obernetter's collodio-chloride paper, we are informed by that well-known dealer that he ceased several years ago to have anything to do with it.

L. E. T.—For such a purpose as that of making varnish, methylated spirits of wine will answer quite as well as the pure ethylic alcohol. If the odour be too strong and unpleasant add a few drops of oil of lavender, by which it will be completely disguised, without any ill effect being produced.

George Scott.—Imperfect stopping of the bottle will explain the thickening of the collodion; it is evident that either you or your assistant must have omitted to insert the stopper after using the emulsion. The remedy will be found in the addition of a little ether. Do not add any alcohol.

One Who is Sadly Troubled.—In addition to the various methods we have recently published for effecting the removal of alkaline-developer stains from the fingers, try the effect of rubbing them with a mixture of hydrochloric acid and water, making use of a lump of pumice stone, but no soap.

B. H. B.—White hard spirit varnish will answer quite well, but it must be diluted with alcohol in the proportion of one-third of the latter. The varnish may be procured from any dealer in varnishes. We are uncertain of the prices, but it is very cheap—so cheap that it would never pay you to prepare it for yourself.

George Hercus.—So far as we are aware the publication, *Studies from Nature*, was discontinued before the completion of the first volume. Our opinion of its merits will be found recorded in our volume for 1875, to which we refer you. Respecting a suitable title for a new work of a similar kind we must decline to offer any opinion or suggestion.

Pyro.—The half-plate lens is quite suitable for enlarging from *carte* size; but it will be necessary that the back lens be placed next to the negative that is to be enlarged, otherwise the definition will be imperfect. The lens marked No. 3 on your list is much more suitable for producing a perfect enlargement than any of the others mentioned, including your favourite half-plate lens.

J. Green.—We cannot offer even a hint as to what method should be adopted in the photographing of sound, unless it be in the direction of attaching to the resonant string a mirror capable of reflecting in a zigzag manner upon a rapidly-moving sensitive surface those reflections it will give from a luminous point. While we are aware of the various fantastic figures assumed by dry sand when it is strewn upon a flat, elastic surface and placed in contact with a vibrating string, we fail to see in what manner this fact would prove of practical utility in your case.

Bengal.—While we cannot speak from an extended experience respecting the comparative value of prisms and mirrors for reversing the images in the camera, still, having had a certain degree of experience with the use of both in this connection, we have arrived at certain conclusions respecting them. It will be enough for your present purpose to be assured that, as respects sharpness, reversed negatives of the first order may be obtained by photographing through the glass plate upon which the collodion film is supported. If flat glass of the best quality be made use of—and for such an important purpose as yours no other should be employed—no defects will be produced by causing the rays from the lens to pass through the glass previous to their impact upon the sensitive film. When an ordinary dark slide is employed there are difficulties of a mechanical character to be encountered in order to ensure correct focussing; but these difficulties are of such a nature as to be very easily surmounted.

South London Photographic Society.—The next meeting of this Society will be held on Thursday next, the 7th inst., in the rooms of the Society of Arts, Adelphi, when Mr. F. A. Bridge will bring before the members a peculiar incident in connection with paper enlargements.

The Photographic Exhibition.—On the evening of Wednesday next the Exhibition will be open from six till ten for the benefit of a worthy object, namely, to aid the funds of the Photographers' Benevolent Association. The admission will be sixpence. We trust that all who can will attend on this occasion.

Paris International Exhibition Awards.—In the list of awards which appeared in our last number there occur several errors, mainly in the addresses of the foreign exhibitors. A proof was forwarded to Mr. Harrison (our Paris correspondent) for correction, but it was not received back at our printing works until after we had gone to press. Our foreign readers will please accept this general notice in lieu of our giving a detailed list of *errata*, which will not now be required.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 4....	W. Riding of Yorks. (An. Meet.)	Oddfellows' Hall, Bradford.
,, 6....	Edinburgh (Annual Meeting) ..	Hall, 5, St. Andrew-square.
,, 6....	Bristol and W. of Eng. Amateur	Museum, Queen's-road.
,, 6....	Photographers' Benevolent	160a, Aldersgate-street.
,, 7....	South London	John-street, Adelphi.

LONDON GAZETTE, *Tuesday, October* 29, 1878.

Petition for Liquidation by Arrangement.
Samuel Jacobs, Dover, photographer and jeweller.
Partnership Dissolved.
Haigh and Hemery, Regent Street, London, photographers.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.
For the Week ending October 30, 1878.
These Observations are Taken at 8.30 a.m.

Oct.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
24	29·30	—	60	45	51	52	SW	Raining
25	29·22	—	55	45	45	47	W	Cloudy
26	29·01	—	56	45	49	50	SW	Overcast
28	29·74	—	52	38	41	43	W	Cloudy
29	29·80	—	47	40	40	44	WNW	Cloudy
30	29·72	—	43	32	35	38	W	Overcast

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 966. Vol. XXV.—NOVEMBER 8, 1878.

TAKING PORTRAITS BY THE ELECTRIC LIGHT.

Now that the fogs and gloom of November have set in, what theme can be more attractive than that of taking portraits and conducting other business connected with photography by means of a powerful artificial light? And what light can equal in popularity, cheapness, and efficiency the electric light? Before proceeding to deal with the possibilities of the electric light in the production of portraits, it is necessary that we go back a little way and inquire what has been already done in this direction.

We commence by saying that we have in our possession portraits taken by the *magnesium* light in 1865 which are in every respect equal to any obtained in daylight in 1878. What, it may be asked, has the magnesium light of a bygone period to do with an inquiry into the capabilities of the electric light of the present time? Much, as we shall speedily show.

Given an intense light in which the element of quantity or diffusiveness does not exist: a subject for inquiry arises in considering the best means for converting intensity into quantity. But, lest any ambiguity attach to our use of these terms, we shall give a popular explanation. By intensity we mean such light as that emitted by the sun when seen surrounded by a blue sky; by quantity we also understand the same luminous waves when intercepted by a widespread mass of vapour or clouds, by which the solar light, instead of reaching us from one point as before, is now radiated from every point of a cloudy mass that includes an angle of many degrees. The powerful beams of the sun no longer reach us in their fierce intensity, but, notwithstanding, we are illuminated none the less. To bring about a similar condition in the strong light of a gas or oil lamp flame it has to be surrounded by a ground glass or opal translucent shade, by which the intensity is softened.

When the magnesium light was first introduced its powerful actinic rays were found to possess certain qualities by means of which photographs of the objects upon which they fell could readily be taken; but at that time photographers seemed to have no other thought than to establish the scientific possibility of obtaining portraits at night by a very brief exposure. While writing this article we have on the table beside us a portrait of Sir David Brewster, taken by Mr. John Moffat and his assistants, at a meeting of the long-defunct Photographic Society of Scotland, nearly twenty years ago. At that time properly-constructed lamps for burning magnesium had not been introduced, and the results obtained were deficient in those graces of fine shading that were afterwards obtained. But we have also beside us, while we write, portraits of Mr. Mellor and Mr. Mather, both of whom were intimately connected with the introduction of magnesium as prepared by Sonstadt's process. These were taken about the year 1865. We are not quite certain whether or not Mr. Alfred Brothers, of Manchester, was the artist on the occasion. We do know, however, that about that time the gentleman just named evinced a keen practical interest in the application to photographic portraiture of the magnesium light. We further know that by means of a lamp which Mr. Brothers sent for editorial notice about that time we were enabled to obtain several charming negatives by magnesium light; and we have ocular demonstration in the pictures before us that the quality of the portraits obtained in 1865 quite equals that of those obtained at the present time. The "Brothers" lamp consists—or rather *consisted*, inasmuch as it is not now made—of a tin reflector of a parabolic form, and of large dimensions, having fittings upon which to place three tapers formed by magnesium wire or riband, and which, being arranged at a short distance from each other, caused the light to come, not from one point as before, but to fall upon the sitter from a large area of illumination. In our own practice with this lamp we preferred covering it with a large plate of ground glass, so as to prevent the direct light of the incandescent magnesium from falling upon, and distressing, the eyes of the sitter.

We have introduced the subject of magnesium light because the precise conditions by which its photographic use is governed prevail also in the employment of the electric light, or even the direct light of the sun. All these systems of lighting are placed on terms of equality as respects their application to the illumination of a sitter for a portrait.

There is now every reason for believing that the electric light will become general amongst us. Let us see in what manner this will affect photographers. With such a source of illumination at command one may imagine himself living in uninterrupted sunshine, all that is required being the means of controlling such a powerful volume of light as to render it subservient to his ends. "A well-lighted picture," said Mr. Jabez Hughes thirteen years ago, "is one where the light falls chiefly in one direction so as to form well-defined but soft shadows. Then a secondary light must be admitted,—not so strong as the principal, otherwise it would produce flatness; but it must be just strong enough to light the main shadows, so that they shall not appear hard and abrupt, but delicate and soft." In this passage is summed up the whole principle of lighting. Let us apply it to lighting a sitter by the electric light.

By the known methods of distributing the electric light a diaphanous screen—whether formed of paper, textile fabric, or ground glass—may be illuminated from behind, and a light so powerful may be radiated from every portion of its surface as to answer all the purposes of photography. By actual measurement we have found that such a screen four feet wide by five feet high serves to illuminate the sitter under precisely the same conditions as those which are found in a studio where the finest work is produced. Let it be remembered that it is the angular, not the actual, dimensions of the radiant—whether that radiant be sky or an artificial cloud—which determines the illumination of the sitter, and that the character of the illumination is determined by the point from whence the dominant light shall fall. For example: if a luminous sheet or artificial cloud light the sitter, certain effects of *chiaroscuro* may be introduced by imparting to one point of this cloud a greater degree of luminousness than to the rest of the surface. The greater portion serves the general purposes of illumination, while the special point gives force and piquancy to the lighting. Effects of this kind may be obtained with the greatest ease by the carbon points of the electric light. Daylight may be imitated in the most perfect manner, and the effects obtained in daylight may, consequently, be thus secured.

It is an old optical axiom—not true, however, in every case—that what has been done by dioptrics may also be done by catoptrics.

To apply this to the case before us: the "artificial cloud" by which the sitter is to be illuminated may itself be illuminated either in front or from the back. The case is similar to the projection of a magic-lantern picture through a transparent or upon an opaque screen.

If a powerfully-illuminated screen of a few feet in dimensions be placed in front of and at a short distance from the sitter, the effect upon such sitter will be the same whether the screen be illuminated from behind or from the front. The great points to be attended to are—first, the preventing any of the direct rays from the radiant falling upon the sitter; and, secondly, controlling the light in such a manner as to utilise as much of it as possible. If an artificial cloud—whether it be formed of ground glass, thin paper, or textile fabric—is to be illuminated from the side opposite to that on which the sitter is placed, the light to be employed in such illumination—or each of the lights, if there be several—must, to prove effective, be encased in a parabolic reflector of such an open form as to ensure the whole of the rays being projected upon the screen, and nowhere else. Nicety in constructing the reflector is not of consequence here, as it would be in the case of a lighthouse; for the present purpose all that is required is that the light be by some means directed on to the screen. Indeed, if the reflector were sufficiently large and brought tolerably close up to the screen, one such reflector would answer exceedingly well even for several flames; and if Mr. Brothers' magnesium lamp, to which reference has been made, were twice the dimensions of the one in our possession and covered in front with a white or pale-blue diaphanous material that would radiate light without absorbing much of it, a more convenient and handy apparatus for illuminating a sitter need not be desired. In this case, of course, a separate screen would not be necessary. In constructing a lantern according to this system we found it necessary to place a broad band of tin round its front margin, so as by its projection to prevent the loss of light which might otherwise take place by radiation to the sides of the sitter, where it is not required.

As regards the nature of the "burner" of the electric light: that subject cannot be entered into at present, but it will afford a theme for an article on a future occasion. Every day is now seeing some fresh advance recorded, and since we commenced to write this article we have been given to understand that, doubtless in consequence of competition and the improved methods resulting therefrom, the entire cost of a set of apparatus requisite for the production of the electric light is stated to be about one-half of what was quoted only three weeks ago. More of this anon.

THE PHOTOGRAPHIC EXHIBITION.

[Fifth Notice.]

Mr. Alfred Harman exhibits two fine, bold enlargements illustrative of a process of enlarging regarding which no details have yet been published.—Several views in the grounds of Grove Spa (250), and others exhibited by Mr. H. G. Inskipp, attest the quality of his dry plates.—A portrait (312), exhibited by Messrs. Wratten and Wainwright, bears testimony to the rapidity of the gelatine plates of this firm; the exposure is stated in the catalogue to have been a fourth of that required for a wet plate.

Messrs. Alder and Clarke have contributed several portraits taken by artificial light with an exposure of twenty seconds. The instrument, or apparatus, in which the light is contained is designated a "luxograph." Four specimens which we have received from Messrs. Alder and Clarke enable us to form an idea at leisure respecting the efficiency of the luxograph, concerning which instrument we shall have a descriptive article in the course of a week or two, when the specification shall have been published. Every effort made to facilitate the production of portraits by artificial light must be gladly welcomed.

Microscopic photography is represented by Dr. George Berwick, who exhibits a frame of neatly-executed specimens of this fascinating branch of our art.

A variety of views taken in and around Hampstead are shown by Mr. E. Bayston.—Among several clever compositions, by Mr. William Cobb, the excellent one, *School Board Dodgers* (258), is worthy of very high commendation. It is an enlargement by the artist himself.—A frame of cabinet portraits (85), by Messrs. Donovan and Co., are fair specimens of average work.—The frame numbered 299 contains two dozen groups and single figures of children, by Mr. W. Allen Richardson. These are of excellent quality both in grouping and manipulation.—Messrs. Law and Sons also exhibit a frame of children's portraits.

Mr. Seymour Conway's collection consists of a frame containing six well-executed landscapes (62). Mr. Conway must have overlooked the fact that two different views which are mounted in juxtaposition have the same clouds. *Verb sap.*—The three pictures exhibited by Mr. Marcus Guttenburg have been produced by a patent process the nature of which has not yet been divulged. The pictures (portraits 144-5-6 respectively) are certainly effective. They possess a grain all over the whites which, combined with certain hatchings, serves as an artistic finish to the vignettes, which may have been executed by lithography. This is merely a surmise; when the specification of the patent is published we shall be enabled to describe Mr. Guttenburg's method.

The contents of two frames of photographs of statuary, by Mr. R. Hedges, appear good, but they are placed too high to be easily seen. —Mr. Hubbard's large photograph (101) from an oil painting is exceedingly fine; so is the copy of a drawing (6) by Mr. Hollyer.—Of similar quality is the collection of cabinet portraits (282) by Mr. S. Symonds, as well as five carefully-executed landscapes exhibited by Mr. R. Keene.—A frame numbered 262 contains a collection of photographs, by Mr. Pointer, of trained cats and dogs.—In No. 256 will be found a large and varied selection of photographs, exhibited by Messrs. Reeves and Hoare, illustrating the effects obtained by Seavey's most artistic backgrounds.—The four landscapes exhibited by Captain Rawes are of a very warm tone.—Mr. Thomas Parkinson has sent several landscapes of fair merit, of which it is perhaps difficult to point to any one picture as being better than another.—A good example of the artistic work of Mr. J. H. Ritchie is numbered 46, representing a window surrounded by foliage.

Excellent alike in conception, arrangement, and execution is a frame of *Costume Portraits* (263), by Mr. W. Shuter.—The *Blind Village Postman* (147), by Mr. H. N. White, is an effective picture, and of two landscapes by Captain Verney preference will, we imagine, be given to his *Fountains Abbey* (103) rather than to *Ripon Cathedral*, in which the clouds are somewhat strongly marked.

Mr. R. Slingsby confines his exhibits to two pictures. *Satisfaction* (208) represents a lady of middle age who, having just completed her toilet, is seen contemplating the effect in a pier-glass (not visible in the picture). The result of the examination is depicted in her countenance, which is befittingly expressed by the title of the photograph. Mr. Slingsby's other picture, *Portrait of a Lady* (209), is a charming picture of a pretty girl. Both are depicted in Mr. Slingsby's well-known effective style.

The frame of interior and exterior views of Hughenden (274), by Mr. T. C. Starling, will be carefully examined on account of its associations with one who wields a great power for good or evil.—A view of *Magdalen Tower, Oxford* (308), by Mr. W. Wheeler, is probably the largest direct photograph in the Exhibition. It is well executed.—Mr. Augustus W. Wilson's *Seven Ages of Man* (293) is an effective series of pictures of large dimensions. To one of this series a medal has been awarded.

On Wednesday morning an interesting feature was imparted to the Exhibition by the display of a screen of views taken in Cyprus by Mr. John Thomson, F.R.G.S. Such charming transcripts of our new possession in the East are in every way worthy of the camera of Mr. Thomson, who in this artistic raid has ably brought to bear his experience acquired in China and in other of his oriental travels several years since.

We shall conclude our notices of the Exhibition next week.

THE SURFACES OF FILM SUPPORTS.

We left the subject last week at a point where the consideration of the porosity or otherwise of the surface was under discussion, our argument tending to show that, while molecular irregularity of surface might exist, the assumption of a state of porosity was not likely to be a correct one.

A question at this stage will naturally arise—What is the cause of the adhesion of the film to the surface? Putting aside the case of a "porous" film where the original cause of adhesion may not unreasonably be assumed to exist—a consideration of which would not be useful in forming an opinion—we may at once look at the film, which, by the action of the acids in the developer and intensifier, has been converted into the "tough" state. Why does it not always become loosened by the action of the water? Granted the same mechanical condition of a number of films, what is the cause of some loosening and others remaining adherent? Such circumstances do exist, and the most likely hypothesis is that the state of the glass surface or the presence of an intermediate agent is the cause.

In the case of albumenised plates, or plates covered with caoutchouc solution, it is very easy to imagine that the well-known natural tenacity of albumen and caoutchouc, &c., enables them to cling to the glass (but into the cause of this we need not stay to inquire); the new surfaces thus produced have a porosity or inequality quite sufficient to give a grasp to the collodion, just as two pieces of smooth writing-paper wetted and placed together will adhere, while two pieces of clean glass with a film of water between them will slide over one another with perfect ease.

With the pure surface of glass, however, a different set of phenomena arise. A tough film will adhere, if no break in its surface be made nor any undue strain; but if a drop of water once gain admission underneath it is capable of separating the whole film from the glass, showing that the adhesion is practically atmospheric, and that when another substance is introduced in any place between the film and its support adhesion ceases.

It should follow, then, that the purer the surface of the glass the easier the film should be made to leave it, and such we have found to be the case. We took a number of pieces of "patent plate," and subjected them to the action of a rather strong solution of nitric acid (one to four of water) for several days, and then most carefully washed all traces of the acid away, wiped with a pure linen cloth, and polished with a similar dry piece. In using these for iron development, followed by pyro., we found the greatest difficulty in keeping the film in its place, even though the surface was roughened all round the edges of the glass; the slightest extra strain upon the film by the washing water seemed to loosen the film, which, in some instances, absolutely broke away if an accidental rent were made near its edge. We could not imagine a stronger argument against the porosity theory, as the glass would have been in perfect condition to allow the collodion to penetrate the pores and adhere by their means.

We found that the surface of the glass treated by solution of wax well rubbed off increased the adhesion materially; so much so that we were on the point of trying an exhaustive series of experiments with it, when we found out a fatal defect. A gentleman informed us that he had in his possession a number of negatives whose films were completely loosened from the glass though standing untouched in his negative rack, and he was able to trace these particular negatives as having had surfaces treated with wax. The use of wax to enable a film to be easily transferred would seem to indicate that adhesion could not be expected to continue—most probably from its atmospheric origin, and the varnish not being able to penetrate through the wax freely enough to bind it in the usual manner to the glass.

A little time ago some foreign writer recommended the employment of tallow for the purpose of causing the film to adhere, and was rather laughed at for his pains. In order to discover if its action were analogous to that of wax we smeared several glasses with it, and wiped it off very carefully in some cases, and in others only to such an extent as to leave a visible film. We were astonished to find that it proved in no way injurious to the general cleanliness of the plate; indeed, rather the reverse. The negative was free from all stains and uneven reduction, but we found a scarcely-perceptible reduction of silver between the film and the glass. We purposely under-exposed and over-developed; but the negatives were otherwise in no way inferior to those taken on the purest of glass, and the adhesion was about natural—certainly not inferior to an average glass. As our aim, however, was practical we did not continue its further use.

The cleanliness of working during the tallow experiments led us to think that if a uniform film of any material which would not spoil the bath were spread over the plates they would be free from that occasional unevenness and spottiness to which we have alluded. The albumen coating so often brought before photographers, but which is by us never universally employed, is a case in point. Albumenised glass *does* work cleaner, evidently through the surface being completely uniform, and so preventing anomalous deposits. But the objections to its use are so numerous that we endeavoured to hit upon another medium, which, with the limited experience we have had, has been completely successful. We coated plates with a thin solution of shellac, made by letting down ordinary varnish by spirits of wine in the proportion of one of varnish to five of spirit. It was difficult to get an even-looking film of the shellac; but we tried even an excessively chilled-looking plate with perfect success. The development was regular, the plate clean, and the film wonderfully adherent.

We do not say this will be a universal panacea for dirty plates, but it is very well worth a careful trial, and led up to it, as we were, by simple theoretical induction it would be interesting should it turn out to be a cure for imperfect glass.

RECENT PATENTS.

No. XX.—NEWTON'S METHOD OF PREPARING AND COLOURING PHOTOGRAPHS.

THE above is merely our own curtailment of the somewhat lengthy title adopted by Mr. Harry Robert Newton in his specification, and which title in full is as follows:—"Preparing materials for and for imparting to photographs and other illustrations of all kinds the tones and tints of natural colours for rendering their representations more real and lifelike, and for improvements in mounting them and coupling them together, and in enclosing them in or between glass, metal, leather, wood, vulcanite, and other frames or cases or ornaments, parts of all of which are applicable to other useful purposes."

THIS invention (which we here reproduce *verbatim et literatim* from the specification) consists in preparing albumenised, gelatinised, plain paper, or other photographs, or other illustrations, similarly coated or not on one or both sides, or with fibrine or analogous or other substances, and all macerated materials—for example, from the thinnest tissue paper to the thickest cardboard—and all fibrous or woven substances or fabrics—for example, from the thinnest silk gauze to the thickest linen or calico—all either plain, coloured, or parti-coloured, or similarly coated, by removing all size, dressing, foreign, or other matter contained therein, by immersion in warm or cold solutions of chloride of lime, soda, benzole, volatile oils or essences, sulphuric, acetic, or other acids, as may be required from the particular manufacture of the various substances to be operated on, or from the quality of specially-prepared materials or fabrics, or other substances, and when cleansed in soft or other waters, immersing them by preference in a bath of warm Canada balsam in its natural state, or in other gums or resins dissolved in benzole, fixed, drying, volatile, or other oils, and when saturation is complete drawing them out between glass or other rollers or plates, removing thereby nearly all the excess of liquid with which the material or substance is saturated, and from which, when set, the remaining encrustation can be removed by benzole or by fixed, drying, volatile, or other oils, so that according to the transparency or semi-transparency required the natural or other surfaces may be left exposed, and when, according to the condition obtained, water, gum, transparent, body, powder, oil, varnish, printing, and other colours or pigments, or chalks, stains, or dyes, can be laid on to the front, back, or on to similarly-prepared or oiled, plain, or coloured, or parti-coloured, macerated, or woven materials, in single thickness or layers, or other substances, on or in front of or between which they are to be mounted, such substances mainly being plain and tinted and coloured glass, opal, enamel, japan, vulcanite, china, earthenware, or gelatine, painted, varnished, and oiled papers, and cardboards, and woven substances, or painted wood or ivory, the two latter of which, to prevent warping, are put together to any size in thin cross-pieces with bevelled lapping edges, and in as many thicknesses as the size requires.

My invention also consists in stretching such photographs or other illustrations on or between perforated metal or other frames, and mounting them on or in front of or between them, and fixing them on to similar or other naturally or artificially-coloured or tinted photographs or other illustrations, materials, or substances, as before described, and also for taking and printing photographs on paper, as before described, mounted on similar perforated metal, vulcanite, or other frames, and for using such perforated or other frames for forming thin folding albums fixed on continuous lengths of woven substances, ribbon, leather, parchment, paper, or other flexible materials, and for applying the method of mounting the photographs or other illustrations to metal and other lockets, or ornaments, or cases, designed to show, by double continuous rollers or revolving centres, one, two, or more photographs or other illustrations, and for the ready changing them with or without opening the metal or other ornamental enclosures or cases within which they are contained, the varying parts of all of which are applicable to other useful purposes; thus, for instance, the prepared papers and woven substances, and the method of mounting, provide a new medium or ground capable of being toned as required for the better luminous production and preservation of pictures generally in oil, water, or other colours, and for drawing, tracing, and transparent uses.

In order that my said invention may be better understood and carried into effect I proceed to describe the same more in detail.

The making all photographs and other illustrations transparent or semi-transparent by saturation as described is for the purpose of mounting them on various materials, plain or coloured, and on white and coloured linens and lawns, and raw and coloured silks and gauzes, and which have also been made transparent or semi-transparent and prepared for mounting on a clear white ground, having first delicately covered with proper shades and tones in oil, water, body, or other colours, or stains, or dyes, the high and white lights, and any other small or other objects or parts to be coloured at discretion in photographs, &c., &c., the usually better, but not invariable, course being to colour out only very small parts or features, leaving the broader surfaces and features undisturbed, and this is done by putting either of the various ordinary kinds of colours, or materials, or liquids on the back or front of the photograph or illustrations where required, or else on the front of the prepared base; and by preference I use body colour with isinglass or size, the effect of which is that the light transmitted upwards from the lowest ground has a blending effect and a translucency for all colours it can penetrate above it, and which is of the first importance for flesh colours, to avoid what is called "chalkiness" in appearance; and to obtain this by saturation as aforesaid, Canada balsam is employed by preference, though nearly all other gums and resins give a somewhat similar result, but lack a certain class of necessary purity and toughness, changing thereby the quality of the reflecting power. Oil is also used, and when in combination with Canada balsam and other gums or resins only sparingly, for a toughening action that is to destroy brittleness.

To prepare the various grounds or bases a pure white gelatine, glazed paper (or any smooth-painted, or glazed, or enamelled material) is stretched on a frame, sizing it strongly on the back to prevent saturation. On this is mounted with Canada balsam any flesh-tinted or other silk gauze of whatever degree of tone necessary, and thin or thick, and in one or more layers as required. Over that again is mounted in a similar way linen or lawn of whatever coarseness or fineness required, and in one or more layers, and this forms the flesh base in portraiture and the ground base in general subjects.

To form the upper coloured base a tracing on stiffish gelatine is made of the principal lines of the subject, and the lines marked on the gelatine are then cut through as in stencil plates. As many coloured squares of paper (thick or thin) or squares of silk, according to judgment, are then taken as the intended colouring of the photograph or illustration necessitates, and, when required for flesh subjects, one additional layer of white linen. The gelatine stencil plate is then put over all these squares of paper and pressed down firmly, and while so held the different thicknesses of the coloured or other paper or materials are cut through, the cut in the lines of the stencil plate guiding the cutting point, so that all thicknesses are correspondingly cut at one operation. One of each of these is then mounted on the flesh or ground base, covering it over entirely, and then (the small parts being coloured out, and which is best done when mounted on metal frames or mounts) the photographs or illustrations are mounted in the same manner on the prepared bases or grounds; ordinary bookbinders' cloth is then mounted on the back, the edges turned over on to the front, and hermetically sealed down, as it were, by varnishing over afterwards.

There are different and various ways of approaching somewhat towards the same result, among them the lower prepared base could be printed in colours in the ordinary way; but the risk of inaccuracy in shrinking, printing, and otherwise, in high-class works and delicate subjects would probably interfere with its general application, besides which there is always a loss of translucency in dealing with opaque colours.

In colouring by hand the photograph, &c., &c., on the prepared base the foregoing difficulties do not exist, though there is greater care required in getting evenness of tone, tint, and colouring.

The foregoing system, though referred to especially for portraiture, as flesh colours and tones are the most difficult to obtain and the most important to achieve, is applicable to any class of subject in any photograph or illustration. All the different substances mentioned, as well as others, form in a greater or less degree materials to operate on to produce the foregoing results, especially ivory, but the grain and the non-absorbent properties, and perhaps the opacity of that material, seem to prevent it returning that depth of reflection which can other ways be obtained, and which is essentially necessary, so as to take off the ordinary hardness of features and outlines that are in a greater or lesser degree characteristic of photographs and other illustrations.

Somewhat similar effects to those hereinbefore described can be obtained by the insertion between the photograph or illustration so prepared and the coloured and toned base underneath of a metal, card, or other frame, so that the representation is lifted up from the surface of the base, and a blending and softening effect is obtained irrespective of the materials of which the base is composed, but more powerful and violent colours have to be used, and more care taken in treatment, though the base can be coarsely and roughly formed, as the absence of impact with the lower layer ceases to require delicacy of adjustment, and, where it is possible to obtain excessively thin patent plate glass, it is best to mount the photograph, &c., &c., between two pieces, and then mount the coloured base on the lower glass, finishing with a cloth back and turning over the edges as previously described.

The different and various materials employed can be either highly polished or else have a ground surface, according to whether the effect is desired to be bright and sparkling or subdued, and the greater the care and the greater the evenness of the materials used the more perfect will be the effect in general, and in treating photographs or illustrations so prepared as transparencies by placing daylight or artificial light behind them.

In preparing paper for photographs (the printing and taking of which is chemically performed in the ordinary way) I find that better results than ordinary are obtained by mounting the paper first on vulcanite or similar classes of frames before coating it or sensitising it, the more so as very much thinner paper can be employed than is ordinarily used; the impact with the negative seems more complete and even, and the positive therefore relatively better printed, besides which the sensitised surface is kept more flat, while drying no creasing takes place, and the whole of the operations of manipulation can also be more easily carried out, and, what is perhaps more important, without the photograph or illustration being touched by the hand.

For the better preserving and exhibiting photographs, &c., &c., so treated (and whether in the first instance mounted on perforated metal frames or not) all mounting frames have perforated edges, so as to be able to sew them round those sides on ribbon (or other endless material) back and front, leaving the bottom ends open until the illustration has been inserted; the whole can then fold up (being fastened continuously) very closely, and in a similar way to an ordinary album, and with a separate or fixed case attached thereto. In the same way photographs, &c., &c., mounted without frames on continuous lengths of materials are wound round double rollers, large or small, and inserted in wooden cases or frames for standing on tables or otherwise, so that with handles to the ends or centres of rollers they can be turned round forwards or backwards without opening the case, and which arrangement in miniature is carried out for lockets or other ornaments, so as to have a number of portraits or illustrations within one enclosure, and changeable with or without opening the frame, case, locket, bracelet, or other article.

Having now particularly described and ascertained the nature of my said invention, and how the same can be carried into operation, I would have it understood that what I desire to secure under the hereinbefore letters patent are the several modes and methods and appliances herein mentioned for dealing each in their degree with the treatment of photographs and all other illustrations, and that I claim the uses of all or any of them in that or other ways, and the application of silks and gauzes, linens and lawns, plain or coloured, prepared transparent or otherwise, using them according to size or otherwise in a greater or lesser degree of coarseness or fineness, and that I do not bind or limit myself by the recited particulars and explanations against the free use of the liquefying or other agents or of colours of whatsoever sort besides coloured materials, as in all works of art the effect of blending or contrast in colour is obtained by placing colours of different qualities in juxtaposition by different means, methods, and applications, according to ever-varying circumstances, combinations, and natural conditions.

The foregoing comprehensive specification of patent will prove suggestive to those who aim at securing coloured effects in photographs.

Our friend, Mr. Herbert B. Berkeley, favours us this week with some "notes" on which we here make some observations. First, with regard to citrate of silver, or, rather, citric *acid* in emulsion: Mr. Berkeley's remarks with regard to the formation of silver citrate by the addition of citric acid to concentrated solution of the nitrate are quite in accordance with our own experience; and in this respect the citrate behaves in a similar manner to the sulphate and other salts which are soluble to a comparatively slight degree in water. It is obvious that if to a strong solution of silver nitrate (which is very freely soluble) we add a snbstance capable of forming a secondary salt possessing a lower degree of solubility no precipitate will be formed until the point of saturation is reached, after which the decomposition of the nitrate results in the deposition of the new substance in extemely minute crystals having the appearance of a fine powder. This explains why citrate, sulphate, and, to a less extent, acetate of silver are precipitated from strong solutions of the nitrate and not from weaker ones by the addition of the respective acids in the uncombined state, and also why, in the case of alcoholic solution of the nitrate, the precipitate is invariable. The newly-formed salt, having no solubility in the latter menstruum, is precipitated, no matter how small the quantity. Mr. Berkeley suggests that the action of the citric acid in restraining or removing fog in emulsion is due to the liberation of nitric acid which takes place, rather than to any specific action of its own. If such were the case, however, how are we to get over the fact that the addition of nitric acid itself under similar circumstances fails to produce a like result? And, again: how is it that the addition of citrate of soda, which entails no liberation of nitric acid, produces an almost identical result as regards the prevention of fog? Theoretically speaking, too, the citrate of silver formed by the addition of citric acid or a citrate to an emulsion containing free silver nitrate would be removed by a prolonged washing owing to its solubility in water; but, practically, we have not met with the "riddled" appearance of the film which Mr. Berkeley describes. It seems to us that the citrate would be formed in a state of division so fine as to preclude all possibility of any such "speckled" result if it were subsequently dissolved out of the film. If it were coarse enough for its particles to leave visible evidence of their removal surely the same particles would be visible *before* removal; but, in our experience, emulsions containing citrate of silver are as fine and homogeneous in texture as any others. With regard to our alleged misconception of the properties claimed for cupric bromide, we may say that our recollection of Mr. Warnerke's classical researches in that direction did not supply us with the "inspiration." We must lay the blame, if blame there be, to the credit of a foreign writer who claimed, on the alleged authority of Mr. Warnerke, the feature we mentioned in connection with bromide of copper. Since Mr. Warnerke obtained the silver medal for his process it has been the privilege of his continental admirers to claim anything and everything as belonging to his method of working or to his teaching, and we, perhaps, erred in not duly inquiring into the assertion we quoted. Our experience with bromide of copper, however, shows how far we support the claim.

ON DRYING GELATINE PLATES.

Although still under the impression that, for ordinary landscape purposes, plates possessing a moderate degree of sensitiveness—such as is easily obtained by numerous modifications of the collodio-bromide process—are more reliable, more certain in their results, and in many other respects better than those of the extremely rapid type that are now being prepared with gelatine emulsions, it must be admitted that there are circumstances in which the greatest possible degree of sensitiveness is desirable, and one cannot read the photographic journals or mix much amongst photographers without being convinced that gelatino-bromide is gradually, but certainly, forcing itself into favour. Of course gelatino-bromide may be made to work as slowly as the slowest collodion emulsion, and there are many advantages which gelatine possesses over pyroxyline as a vehicle for the silver bromide; but, notwithstanding, it has several disadvantages which, especially to the inexperienced, tend to make its working difficult. The most important of these are, doubtless, the difficulties connected with the drying of the plates after they have been coated, and the attendant evils of dust and decomposition incident to gelatine films kept long moist.

A considerable experience with gelatine plates warrants the belief that frilling and red fog both arise from some change occurring in the film in cases where it has been kept long moist; or, at least, when the drying has been rapidly performed those banes to gelatine work have not shown themselves. But, unfortunately, to dry such a plate rapidly is no easy matter, and requires conditions very different from such as are suitable for drying collodion films. The conditions are well understood, namely, frequent or, rather, constant change of dry air at a moderate temperature and freedom from dust. But, although many arrangements have been devised, I had until a few days ago seen nothing that seemed to me capable of doing the work efficiently and certainly.

The apparatus which I am now about to describe has been constructed by Mr. Dickson, an Edinburgh amateur and a mechanical genius of much ability; and I am so satisfied with its suitableness for the object in view that I believe it only requires to be known to be generally adopted by all who have the necessary convenience. It consists of a chamber in which the plates lie, an arrangement for the supply of heated and filtered air, and a mechanical appliance by which such air is constantly and rapidly drawn through the chamber. The chamber is a box not unlike an ordinary plate-box laid on its side, and measures $15 \times 8\frac{1}{4} \times 11\frac{1}{2}$. In what would be the bottom of the plate-box, but which is one end of the chamber, there is a three-inch hole, which, when the apparatus is in use, receives the kneed end of a zinc tube coming down through the roof of the dark room. To the other end of this tube, outside the building, is fixed what is known as "Dobson's induced current ventilator"—a simple piece of apparatus similar to that described in this Journal by Mr. Laing as "Boyle's patent ventilator," which will be found in the last volume of the Journal, at page 219. About three inches of the box, corresponding to the lid of the plate-box, is movable, and fixed in its position by hooks, or by a hook and hinges in the ordinary way. On opening this it is found filled with a series of three sets of overlapping laths, intended for the double purpose of excluding light and diffusing the current of air, which enters by a three-inch tube in the lid—that is, the end of the chamber. The two sides of the chamber are fitted with horizontal grooves sufficient to hold three dozen 9×7, or, by a slight alteration, twelve dozen quarter plates; and, as it is easy to make the box level, the plates are slipped in one by one as they are coated. The opening in the lid—that is, end—of the chamber is fitted with a three-inch tube about two feet in length, and pressed nearly flat for a few inches in the middle. Under this flattened portion is placed a small lamp or Bunsen burner, the size of the flame of which can be adjusted so as to raise the ingoing air to any required temperature. The end of this tube is partially closed by a filtering medium of muslin and cotton-wool, for the purpose of keeping back the particles of dust with which the air is at all times charged, and which, without some such arrangement, would render the plates useless.

From this brief description the action of the apparatus will be obvious. The ventilator, acting on the same principle as the once-popular perfume spray producer, causes a constant upward current in the tube connected with one end of the chamber. The air thus withdrawn is replaced by the heated and filtered air from the tube at the opposite end; and, as warm air holds more moisture than air that is cold, the plates are uniformly and rapidly dried.

It will, of course, be evident that the ventilator, which is the mainspring of this arrangement, will only act in presence of a current of air—when, in fact, there is some wind blowing; but I feel certain that nothing short of an actual examination of the apparatus in action would convince any one of how little wind is required to produce a sufficiently-rapid current for the purpose. On the occasion of my visit to Mr. Dickson there was not sufficient wind to stir the few remaining leaves on the trees, or to indicate the direction from which it was coming, and yet on placing an anemometer at the end of the inlet tube it at once indicated a velocity of fifty feet in twenty seconds, and a number of trials gave an average of about two miles per hour.

A thermometer placed in the drying-box showed how perfectly under control the temperature of the ingoing air was; and by a variation in the size of the flame or in its distance from the tube the temperature might be steadily maintained at from 60° to 90°—a range quite wide enough for anything connected with gelatine plates. I do not, of course, mean to say that Mr. Dickson's drying apparatus is incapable of improvement—few first attempts are; but I am satisfied that, even as it is, it will be a boon to all gelatine workers who may give it a trial, as it will do away with what I believe to be the main cause of most of the complaints so frequently made against that interesting and valuable process.

Although in the case in question the ventilator has been let in through the roof of the dark room, this is merely an arrangement for the sake of convenience and not of necessity, as it may equally well be let in through a window or hole in the wall by kneed joints, and when not in use for drying purposes will form one of the most effectual means of changing the air of the laboratory and getting rid of the vapours of ether, &c., generally so injurious to the health of those who have to breathe them for any considerable length of time. JOHN NICOL, Ph.D.

ON RECOVERING WASTE SILVER IN PRINTING.

[A communication to the Liverpool Amateur Photographic Association.]

It has often been a matter of surprise to me that so few make any attempt to recover the waste silver which usually goes down the sink during the operation of toning silver prints.

I am sure it will repay recovering, even to the amateur who works on a small scale, unless, indeed, it is on a *very* small scale. As to professional photographers: I fancy most save their residues in some form or other, though on lately conversing with one in a large way of business I was surprised to find he made no attempt to save any portion of the large amount of silver that was constantly being thrown away; for he considered that the amount, if recovered, would not repay him for the time, trouble, and expense of such recovery.

In order to test this point I have recovered the silver from the printing of a known quantity of prints, and I will now lay the results before you. The operations were performed in a very rough and ready manner, and therefore the result will probably not show as favourably as if more care had been taken and a larger quantity of residues had been experimented upon.

I operated on forty-eight (8×5) prints, or a quarter of a quire of a commercially-sensitised paper. By adding a little common salt to the first two waters in which the prints had been washed before toning I obtained fourteen grains of chloride of silver ($Ag\,Cl$). By adding a little solution of sulphide of potassium, or liver of sulphur, to the fixing bath I obtained seventy-six grains of sulphide of silver ($Ag_2\,S$).

Now, in 14 grains of $Ag\,Cl$. there are 10 grains of pure silver,
And in 76 „ $Ag_2\,S$ „ 66 „ „

Total.........76 grains of pure silver.

This is equivalent to 119 grains of nitrate of silver ($Ag\,NO_3$); and, taking nitrate of silver at three shillings per ounce, its value is tenpence, or twenty per cent. of what the sensitised paper cost me.

But, properly, the percentage should be taken on the amount of silver in the paper originally, and should not include the cost of the albumenised paper. I have no ready means of ascertaining this, but I imagine it would be about forty to fifty per cent., and probably more when larger quantities are operated upon.

W. HORSEMAN KIRKBY.

NOTES ON VARIOUS MATTERS.

I SEND a few notes, the result of several observations lately made. All the plates I took with me on a photographic tour last August, though apparently perfect on preparation, were entirely spoilt by a peculiar kind of spot, which generally gave density to the parts of the sky they affected and clearness to the shadows. On further keeping, the plates, on development, show clear spots only. This is my present experience. The plates prepared from washed emulsion had been washed previously to drying, without a preservative. In despair of any chance of success I wrote for some Liverpool emulsion. With this I prepared a few plates, but was only able to expose one during the next day—the result was spotless. This was a comfort, though I felt that "borrowed plumes" had something to do with success. Next day I exposed the remainder of the plates, fully expecting equal results; but fate had ordained otherwise, and I came to the conclusion, which experience justified, that I could not expect to secure passable results if the plates were prepared more than a few hours before exposure.

I was also sometimes troubled with numerous little purple-black spots in the lights, sky, &c. These appeared after fixing and drying, as far as I could discover. Then there were also black "stars and stripes." Sometimes this effect appeared to start from a nucleus, straight lines being drawn from this at various angles; sometimes the marking proceeded "herring-bone" fashion; and sometimes straight, fine, hair-like lines crossed each other at right angles, giving the idea that something more than chance operated in their formation. The hydrosulphite developer was used, and this leads up to another "note."

I do not find, as M. Sammann stated, that sodic hyposulphite ($SSO\,Na\,o_2$) is formed on keeping the bisulphite and sulphite solutions I use in long contact with zinc—even for days. No precipitate of sulphur is given with hydrochloric acid; sulphurous acid is alone evolved, proving the solution to contain a sulphite. In addition, the action of such a solution is more energetic than that of a solution which has been in contact for half-an-hour only, and generally produces fog. With this knowledge, when I wish part of a bottleful to keep well during a day or two I put a fragment of zinc into the bottle used for storing the hydrosulphite. This, I believe, resists the oxidising action which would otherwise set in.

I have been struck by another fact in connection with this developer. I have been using lately a pyro. solution containing a small proportion of tannin. On addition of the hydrosulphite solution to the alcoholic pyro. a drab-brown precipitation takes place, which continues during the development of a plate. The developer, on keeping, does not darken, as is usual; neither does it do so on addition of ammonia in small quantity. The precipitate appears to be insoluble, or nearly so, in water and in alcohol. I have not determined the action of the tannin, but believe that the usual discolouration ensued when the solutions were freshly made. The effect may be due to the formation of sodic sulphate, which, probably, is a powerful restrainer.

I have several times found ammonic sulphate to restrain powerfully; it acts vigorously in this way in keeping a collodio-*chloride* plate clean under the hydrosulphite development. I think I have already published the fact that washed silver paper which has not been exposed to light will give a clean image with the hydrosulphite developer. The albumen, probably, prevents too energetic action.

Now for the next "note." Mr. W. B. Bolton stated, not long ago, that he had obtained plates which transmitted a bluish light when dry and a yellowish light when wet. At that time my experience was the opposite to that just stated. I have lately prepared a plate or two from Liverpool emulsion (after the addition of a rather large dose of ether, and I note this) which act in a similar manner to Mr. Bolton's. It is a result purely due to the state of aggregation of the particles. Apparently, pyroxyline during drying may act either in bringing the particles closer together or in separating them. Very coarse films, however, may transmit a red or orange light. I find that a collodion which had been treated to a large dose of potassic carbonate and then to a similar haphazard addition of sulphuric acid, though giving a coarse, white film, still transmits mainly the yellow rays of a lamp. I see it stated in Watt's *Dictionary* that argentous citrate gives on heating the solution, which is of a red colour, first a green and then a blue colour, then depositing metallic silver. May not these colours be caused by metallic silver in different states of division?

This brings me to the next "note." I have been trying a few experiments with silver citrate. I find that if a nearly-saturated solution of silver nitrate be formed, and then crystals of citric acid in combining proportion (210 : 510) being added, a crystallisation takes place in the tabular form of silver nitrate. The effect is the same on heating moderately. If a small quantity of alcohol be added no change seems to be effected; but, on addition of a larger quantity, the transparent crystals become milky white. These are fairly soluble in water, but hardly at all so in alcohol. These experiments show what happens when citric acid is added to collodion emulsion containing free silver nitrate; the citric acid decomposes the nitrate, and nitric acid is set free. This latter in the nascent state is, probably, the cause of the removal of the fogging tendencies, and not the citric acid *per se*. On washing the emulsion the whole of the silver citrate is dissolved out—more quickly with warm water. If a plate containing silver citrate be washed, dried, and all the operations gone through, the film will be found riddled with pinholes and transparent specks. These are due to the silver citrate, after the film has set, being removed by the water. It is absolutely necessary to wash the emulsion before coating plates with it. It is possible that silver citrate may have advantages of its own as replacing silver nitrate for the formation of emulsions. By the addition of a soluble bromide to the silver citrate silver bromide is formed, the citrate of the base remaining in solution.

The mentioning of "bases" reminds me that the Editors appear to be somewhat in error as to the alleged capabilities of copper bromide. If they refer to Mr. Warnerke's experiments they will find that copper heads the list for "*intensity*," while in sensitiveness it is far behind—barium, zinc, calcium, and manganese being most favourable to sensitiveness. Calcium, lithium, and strontium were found not to fog; all the others did. Copper preserved "perfect transparency in the darkest parts." I thought my memory had not failed me *there*, so I turned to page 148 of the Journal for 1876.

While on this subject I would say I have remarked it as curious that so few appear to recognise the fact that, with zinc bromide *collodion* emulsion, *the silver nitrate being in excess*, plates may be obtained which, for all ordinary landscape purposes, do not require "backing" or a stained substratum. I have prepared a good, rich emulsion when using zinc and ammonium bromides in combining proportion. I never make any addition whatever to my plates, and they do not "halate" (if I may use the term) so much as many plates which have been "backed."

I omitted to say in an earlier portion of this communication that I trace the cause of the "stars and stripes" to the filtering material, which was wool—not the *American* article, but sheep's wool. The emulsion after standing some days, with shaking, fails to give these bad imitations of the national emblem! I would suggest well-cleaned glass wool, kept in a bottle, as a possibly-useful material for filtering.

Herbert B. Berkeley.

PRACTICAL INSTRUCTIONS IN MODERN PHOTO-MECHANICAL PRINTING METHODS.

Part I.—PHOTOLITHOGRAPHY.

V. Management of the Inking Rollers, and Further Treatment of the Fatty Image.—Before proceeding to subject our lithographic stone to any further treatment, it is necessary to provide at least one good inking roller, which, if new, will require a course of preparation before being fit for use.

If the student should not intend to begin his actual printing operations for a few weeks he had better purchase a new roller, and get it into working order himself; but if, on the other hand, he should wish to begin work at once, it will be better for him to buy a second-hand roller, or one which has undergone the course of preparation necessary to fit it for immediate use.

The lithographic roller, as generally employed, consists of a cylindrical core of wood about three or three and a-half inches in diameter, and ten or twelve inches in length. Each extremity of this cylinder is provided with a handle about four inches long and an inch in diameter. This wooden cylinder is covered with one or more layers of flannel, and over this is placed the covering of calf-skin which forms the working surface of the roller. This calf-skin covering is sewed together so as to form a tube a little longer than the body of the roller, and those parts of the leather tube which project beyond the cylindrical part of the roller are drawn together by means of cords interlaced in the ends of the leather covering. In the case of the ordinary lithographic roller, intended for line or crayon work, the flesh side of the skin is placed outside; but in the case of rollers intended for colour work, or for certain other special uses, the flesh side of the skin is turned inwards. The projecting handles of the roller are usually provided with loose leather covers, intended to protect the hands from continual friction against the wood.

In selecting a new roller care should be taken that the skin is uniform in thickness and even in texture. It often happens that some parts of a roller are soft and spongy, while other parts are compact and close in the grain; but this state of things is very inconvenient when fine work is to be inked with the roller, as the soft parts tend to deposit more ink than those which are harder and more compact.

The roller having been selected, the next step is to prepare it, or so to saturate it with lithographic varnish or printing ink as to prevent its absorbing any undue amount of moisture during the process of printing. Before commencing the operation of saturating the leather of the roller with fatty matter it is well to see that the roller is quite dry, and if it have remained in a warm room for a few days it will be in a better condition to receive the fatty matter than if the preparation were commenced immediately on receiving it from the warehouse. Lithographic varnish, which is used to saturate the skin of the roller, consists merely of a very carefully-prepared boiled linseed oil; and the consistency of this varnish varies according to the purpose for which it is intended. The most generally-useful varnish is known as "middle varnish," this having about the viscosity of ordinary golden syrup, while a thinner kind is sold as "thin varnish;" and a still less viscous preparation is procurable under the name of "tint varnish," or "S. H. varnish." Thicker varnishes, sold as "strong" or "extra strong," are often required. The new roller, having been well worked in middle varnish, is left at rest till the next day, in order to allow the fatty matter to penetrate into the pores of the leather. On the next day the surface of the roller is well scraped with an ordinary table knife, which ought not to be extremely sharp; and during this operation great care should be taken not to cut or otherwise damage the surface of the roller. The roller is then well worked backwards and forwards on a slab charged with a fresh supply of varnish, and after a day or so has elapsed the operation of scraping must be resumed. These operations should be repeated every few days until the leather becomes thoroughly saturated with the varnish; and the time requisite for this will depend not only on the character of the leather, but also on the extent to which the operations of rolling and scraping have been practised. When the leather covering of the roller becomes soft and rather elastic to the touch the preparation may be continued with a mixture of equal parts of lithographic printing ink and of varnish. After a preparation extending over a week or ten days the roller will be fitted for rough work consisting of clear, bold lines; but, as an insufficiently-prepared roller requires to be charged with a considerable amount of ink in order to protect it from the effects of moisture, such a roller cannot advantageously be used for the inking of delicate subjects which contain approximations to half-tone, as an unduly-charged roller would certainly clog up and destroy the more finely-shaded parts of such subjects by gradually overloading them with ink. After a roller has been in use for some time—especially if it have not had sufficient preparation—it is frequently necessary to allow it an interval of rest, in order that traces of moisture which have been absorbed during the operation of printing may be permitted to evaporate. It will naturally be understood that the occasional using of a roller, together with the cleaning and scraping required to keep it in working order, amount to the same thing as continuing its preparation.

If the student should determine to purchase a second-hand roller he should take care that the skin is not worn thin in parts, and that it is free from indurated ink. It sometimes happens that an old roller is so thoroughly sodden in varnish or ink that all the grain of the leather is gone, and the surface of the roller feels dead and totally inelastic. Such a roller should be rejected. The second-hand roller must be scraped, and then carefully wiped with a cloth moistened with oil of turpentine, after which it may be charged with a mixture of ink and varnish. Any parts of the surface which are slightly indurated must be softened by rubbing with a wire brush or with powdered salt.

Having now provided an inking roller* which is in good working order, and is uniformly charged with a thin film of ink, we now proceed to soften the gum covering of our lithographic stone by gently sponging it with water. When the whole of the gum is dissolved the surface of the stone is freed from the excess of water by means of the sponge; and care should be taken, while the stone is uniformly damp, that there are no drops or ridges of water projecting beyond its surface. The inking roller is now worked backwards and forwards over the surface of the stone, a considerable pressure and a slow rate of motion being employed. Under these circumstances every part of the device should become fully charged with ink, even to repletion; and no tinting of the whites of the stone ought to occur if all the operations have been properly conducted. Every

* Many attempts have been made to introduce india-rubber rollers for lithographic printing, but with varied success. Quite recently Messrs. Blades, East, and Blades have introduced an india-rubber roller which bids fair to do much towards the disestablishment of the usual leather roller. The new roller, manufactured under a patent of Mr. Lanham's, consists of a rigid stock clothed with a moderately-thick layer of red india-rubber, which is vulcanised after having been put on the stock; and this india-rubber covering is finally worked to a true surface on the lathe. This kind of roller has the advantage of being always ready for use, and it can be rapidly cleaned by gentle friction with a cloth moistened with oil of turpentine, after which it may be immediately used for another coloured ink. For occasional use there can be no doubt as to the superiority of a properly-made india-rubber roller over a leather one. More will be said regarding the various kinds of india-rubber rollers when the subject of collotypic printing is brought under consideration. Those who wish to experiment on this subject may, in the meantime, cover an ordinary lithographic or typographic roller with a sheet of red vulcanised india-rubber, the edges of the india-rubber being cemented together so as to form a tube. An india-rubber roller requires far more frequent feeding with ink than an ordinary roller; as in the case of the former the ink lies only on the surface, while a leather roller is saturated with ink to a considerable depth below the surface.

part of the image having been thus thoroughly charged with ink a rapid motion is imparted to the roller, and the pressure on it is at the same time reduced. This quick rolling is continued until all excess of ink is removed and the image is seen to be clear and sharp. In the case of a bad transfer, or of one carelessly put down on the stone, it will often happen that some portions refuse to take the ink in a satisfactory manner, the lines appearing grey and spongy. When this is the case it is generally best to make a fresh transfer and to be more careful with the manipulations; but the defective parts may often be improved by covering them with mucilage and then rubbing them with a little palm oil spread on a piece of rag, after which treatment the inking is repeated.

The stone is next flooded with water, and any ink-marks on the edges are removed by friction with a piece of pumice or of snake stone, after which the lithographic stone must be reared up to dry. When dry it is to be dusted over with finely-powdered resin, and the excess of this substance is removed by means of a broad camel's-hair brush. The stone is now ready for the acidulation or etching, and a convenient mixture for this purpose is made by dissolving ten ounces of gum in fifty ounces of water, and then adding one ounce of strong nitric acid (s.g. 1·42). The stone being placed horizontally, the etching mixture is freely applied by means of a soft brush, and this having been done the stone is ready for the press. If, however, the printing operation is not going to be performed at once, it is as well to cover the face of the stone with a layer of gum in order to prevent damage if any fatty matter should come in contact with it.

The amount of acid in the etching fluid may vary greatly according to circumstances; but a careful observation of the effects of over-acidulation or under-acidulation will enable the student to regulate the strength of the acid which he makes use of. When the etching fluid is too strong the finest lines of the subject or the most delicate gradations are removed, despite the resinous coating, which is intended to act as a bulwark against the destructive action of the acid. If, on the other hand, there be not sufficient nitric acid in the etching fluid the stone will generally be troublesome in printing, the lines tending to spread out and become thicker, and the whites of the stone tending to take the ink and to become tinted. A bold subject, containing no fine lines, should be very strongly acidulated, as there is but little fear of injuring it, and the strong acidulation renders the printing easy and rapid.

The operator must not lose sight of the fact that during warm weather the etching fluid rapidly decomposes and becomes very much more acid than when freshly made; and, as a high temperature also conduces to render the action of the acid more energetic, the effects of over-acidulation are more likely to be met with in the summer than in cold weather. It is also important to bear in mind that ordinary mucilage of gum arabic becomes acid by long keeping, and the careless use of very sour mucilage may lead to inconvenience and to the injury of delicate subjects. Fine subjects may often be advantageously etched by means of sour gum, applied after the first inking in, and dusting with resin.

Before adjourning the case for a fortnight, when the actual printing operations will be considered, we must provide for the safety of the stone and the roller. The stone is supposed to be gummed, and is so far safe, only it ought not to be exposed to any very direct heat from a stove or the gum may scale off, carrying with it small portions of the lithographic stone. The roller having been scraped, and wiped with a cloth moistened with oil of turpentine, is next covered over with an exceedingly thin film of tallow, by rubbing with a cloth saturated with this substance. Before recharging the roller with ink the tallow must be carefully removed by scraping and friction with a rag moistened with turpentine.

T. Bolas, F.C.S.

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

What *can* be done in order to make the wheels of the medal-award system run smoothly? It is very painful to read about jurors displaying favouritism or partiality in making their awards; but seeing that opinions, whether rightly or wrongly, are entertained by many that there is something rotten in the system by which awards are now made, it may be well to inquire in what manner such grievances may have their *raison d'être* removed. Partiality implies a strong feeling of friendliness existing between the exhibitor and the juror; and owing to such feeling the juror, it is presumed, cannot very well afford to pass over his friend, who might thus be converted into an open or covert foe. Not only so: he may not even dare to make an award to some really deserving exhibitor because it might give offence to his own friend interested in having the former kept in the background. The remedy for such a state of matters is very simple indeed; but it demands more courage for its adoption than is usually found to prevail among the managers of medal-awarding bodies. It consists simply in securing the services of qualified jurors who, coming from a distance, have no knowledge of, and sufficient force of character not to care for, private and personal interests. For example: suppose that, for once, this system were applied to the awards connected with the Photographic Society of Great Britain. Several eminent men of the very highest character for competence and skill could be brought together to act as a jury who would scorn to be influenced by partisanship; at anyrate, the public would accept their *dicta* as having been given untrammelled by any private considerations. The expense would be nothing compared with the advantages; indeed, it may be questioned if such jurors would not willingly defray their own expenses in recognition of the implied honour. Till some such course as this is adopted I fear that a large proportion of those well able to produce prints for exhibition will decline doing so. "Desperate diseases require desperate remedies." The adoption of the course indicated might be taken as a confession on the part of the managers of such a society as that named that they recognised the justice of the aspersion thus cast upon their personal honour; but it would give great satisfaction to many photographers, and immensely increase the number of contributors to these annual exhibitions. Referring for a moment to the non-award of a medal by the jurors in Class XII. at the Paris Exhibition, for the reason hinted at by Mr. A. L. Henderson: the affair seems one that should be brought into the full light of day. The charge is an ugly one, and the public expect that some notice of it shall be taken by those interested. It is said that correspondence exists which, to some extent, bears out the charges that have been made.

* Concluded from page 518.

Of all the examples of impracticable ingenuity which have appeared during the past month that displayed in the production of "plastic" pictures stands unrivalled in absurdity. Instead of making use of a round aperture in the diaphragm of the lens, as determined by theory and common sense, and in practice found to be best, Herr Paul Gliese imagines that he obtains better results by making use of apertures of various fantastic forms than by adhering to that furnished by the optician. This far exceeds a small but similar absurdity that wellnigh became epidemic a good many years ago, and which took the form of making the aperture in the diaphragm of such shapes as keyholes, bottles, vertical and horizontal slits, crosses, and soforth. This nonsense soon passed away, and English photographers, like men of sense, relegated such things to the limbo of forgotten whims; but *now* an aggravated type of the same disease is breaking out on the continent. I would suggest as something different from any of these diaphragms one formed of nickel silver electro-plated and perforated with holes similar to the rose of a garden watering-pot. This would possess at least the attribute of novelty, and most certainly answer the purpose quite as well as any of the methods suggested.

Observing from the annual report of the Manchester Photographic Society that Mr. D. Young exhibited a "Keevil's lantern, *perfected*," I am tempted to inquire in what respect it has been rendered "perfect," or, to use a better term, "improved." When Mr. Keevil achromatised the rectangular prism by which the side light of one of the elementary portions of the lantern is converted into direct or front light he, in my estimation, gave the finishing touch to what must be admitted is an ingenious and very effective instrument. Now that the magic-lantern season is approaching—nay, has already arrived—one is naturally desirous of being made acquainted with every improvement to which this amusing and instructive piece of optical apparatus is subjected.

NOTES FROM AMERICA.

Attaching Photographs to Glass —Posing Chairs.—Rustic Studio Appliances.—Rock Scenes.—Imitating Snow.

On the authority of the *Scientific American* we give the method of attaching photographs to glass and making them transparent adopted by Mr. W. Watson, of Harriston, Canada:—

Allow the photograph to remain in water till thoroughly soaked, then place between blotting-paper. It should remain until it is just damp enough to be pliable. Then coat the face of the picture with good paste made from flour or starch, and lay face on the glass. Commence in the centre of the picture and rub outward toward the edges to dispel all air or paste. Be very careful not to get paste on the back of the print.

Keep it damp with a sponge until the rubbing is finished, being careful not to break the surface of the paper. When perfectly dry lay on a heavy coat of castor oil, and it will soon afterwards become transparent. If you get too much oil rub off the surplus with a cloth. Allow it to stand for a day or two, when it may be coloured.

Apropos of posing and posing chairs, upon which topics Mr. John L. Gihon has been treating in the *Photographic Rays of Light*, that writer observes:—

These posing chairs are generally very ingenious contrivances, but photographs into which they are introduced seem to carry with them the very odour of the operating-room. They are too unmistakably conventional in character. A great deal of care is bestowed on the principle of raising and lowering the back. As much attention should be extended to the seat of the chair. There are human beings whose nether extremities are decidedly long, as well as there are those who are endowed with "elegies" tending in the other direction. The one height of stool is neither comfortable or becoming to all classes.

I have seen a pianist's chair that would be most useful in a studio. The seat and back are joined together, and are elevated or depressed simultaneously by turning them around upon a central screw. No arrangement can be more simple or satisfactory. It used to be a prevalent idea that actors and actresses clothed in shiny muslins or cambrics, whilst on the stage and at a distance from the audience, would look equally as well dressed as if clad in silks and satins. In my boyish days I remember on several occasions hearing the talk of those who were about to sit for daguerreotypes. They always claimed that gaudy designs, and not a superior quality of fabric, were all that was necessary to adorn one's person. The principle in both cases was that a sham could be made to answer the purposes of a genuine article. So in the furnishing of operating rooms I have frequently seen accumulations of shams that were expected to successfully take the place of good, solid cabinet-ware. A book-case, writing-desk, sideboard, table, and no end of other accessories are formed by the movement of the various parts. The arrangement reminds one of a box of building blocks. The sham in this case, too, is apparent, and cultivated tastes will not, in any of these instances, admit of the imposition.

All rules, however, admit of exceptions, and so does this one. Outside or landscape effects can be successfully imitated. The forms of the object that surround the figure are broken in character, and, as particular sharpness is not desirable, it is difficult when looking at the photograph to decide of what material they are composed.

Rustic Accessories.—An entry in my diary declares that I had spent the greater part of the week in the construction of rustic accessories. Of all the work in connection with our business this can be counted upon as being the dirtiest. You use a great deal of glue; that sticks to your hands and clothing. You are continually handling powders of various colours; they adhere to the glue. In fact, your person receives a fair share of all that is consumed in the manufacture.

Studio Grass.—When first we commenced to make rustic pictures it was some time before a good imitation of grass suggested itself. Ultimately some happy wight of a photographer must have wiped his feet upon one of those large Indian mats that have long shreds of grass woven into them. Their suitability for our purposes occurred to him at once. His discovery became known, and his ingenuity was rewarded by every one in the craft copying his idea, or rather adapting it to his own use. Nothing can be better.

Rocks and Stumps.—The making of rocks and stumps of trees is a more serious matter. The real articles are, of course, inadmissible on account of their weight. In one of my galleries I had reserved a sky-light room which I used for no other purpose than the production of these landscape effects. In it I accumulated an immense amount of stuff that a tidy housewife would doubtless have entitled "trash." I had rocks (?) six feet in height. Upon one occasion I built up quite an extensive grotto. It took up the entire width of an ordinary background. When finished and tried I became disgusted with it; but, contemplating its shape and pondering over the matter a few moments, I made up my mind that it could be utilised. I sawed it in half, and with a few alterations that readily suggested themselves I found that I had a splendid rock, and the trunk of a tree almost large enough to represent one of the Californians. These articles must be made strong enough to be tumbled about, to stand rough usage, to be sat or stood upon, and yet light enough to be easily handled. The most generally useful form that I know of is a rock to one end of which is attached the stump of a tree. The top of the rock should be large enough for a grown person to sit upon comfortably, and the stump should rise above it high enough to allow the arm to rest easily upon it. To construct such a contrivance, procure an empty, well-made packing-box, two and a-half feet in length, eighteen inches in width, and twenty inches in height; knock off the lid and turn it bottom upward. Remember that all superfluous weight is to be avoided. Within about six inches of one end, and at an angle, bore a large hole and drive into it a stout stick that will have an altitude of twelve inches. Make a disk of wood about six inches in diameter, bore out its centre, and let it drop to the base of the stick. Nail a round cap upon its top, four inches in diameter. To this top cap and to the lower disc nail strips of lath around their entire circumference. You now have before you an oblong box surmounted by a sort of leaning tower. They are indispensable foundations for that which is to be, but, I own, not very attractive ones. The next effort must be to break up the straight lines of the model. Procure a number of sheets of the stoutest and toughest wrapping-paper you can obtain; also a quantity of any sort of cheap packing, corn-husk strippings, old newspapers, shavings, or, in fact, whatever worthless stuff may be at hand. With this rubbish make piles, ridges, or whatever shaped inequalities of surface suggest themselves to you. Secure them in position by tacking over them the heavy paper. Pay attention to the forms of natural objects, and don't make your rock look like a meal bag. Wrap some of this loose material around your stump that is to be, and to its base attach a couple of snake-like appendages that will answer for roots. Don't try to make this part of your work smooth in appearance. The rougher it is the better, so long as the forms you create are possibilities. Since everything is so easily altered whilst in this condition, be sure that you are thoroughly satisfied with its shape before you advance further. When ready, soak some stout muslin, or, better still, light canvas ducking, in a kettle of strong glue water. Take it out, all dripping, and spread it loosely over your model; then with pieces of wood, shaped like chisels with blunt edges, fashion your covering to the inequalities you have already planned. Maintain sharp and angular edges as much as possible. The tree stump must have its imitation of bark made up of wrinkles or ridges. The top of the rock—that part which is intended for the seat—can have the ducking drawn over it smoothly. In doing all this forget personality and all care of your clothes. Before you commence you must make up your mind to get dirty. Put your whole attention to the work. As the glued canvas becomes about half dry it is in the best condition for modeling into shape. If you have spent much time over this stage of the work, and portions of it have already become stiff and hard, you had better let it rest over until the next day. Then tack down all loose edges, and make whatever corrections in shape you think would be beneficial. You can next procure some paints, in powder, of sombre colours, such as raw umber, Vandyke brown, light red, dark green, black and white. Paint your "bit" over with more glue sizing, and upon the wet space sift the colours with as near an approach to their proper natural position as you can reach. It is not necessary or proper to use these colours singly. Combine them together. When you wish to lighten them in tone, add white; to darken, add black. When you get to the stump incorporate a considerable amount of green to your compound. A sprinkling of finely-broken-up *mica* upon the rockwork will do much to heighten the effect. As a finality, I would suggest that the top or flat surface of the rock should be painted in oil colours, also the top of the stump. No matter how well the glue takes hold of the powders there is still a possibility of a portion of them adhering to the dresses or clothing of the sitters. When in use such a piece as I have been endeavouring to describe can be much enhanced in value, or rather denuded of much of its bare appearance, by throwing upon or around it strips or remnants of one of the mats I have spoken of, and that had most likely been condemned to be thrown away. Those stray bits are often more useful than the perfect mats. I have often been accused of wanton destructiveness when I have been seen slicing one into all sorts of shapes. My description of the making of this particular rock is certainly sufficiently clear to act as a guide for the manufacture of others. I neglected to state that in the make-up of the picture still greater improvements in effect can be obtained by the introduction of light vines made up of artificial leaves. The great trouble is that in all photographs of this class the photographer has a tendency to overdo the matter. A little stuff well placed is far better than a great deal when put where it should not be.

Rustic Bridge.—There is scarcely a limit to the number of effects that can be readily produced with but slight changes of accessories. A rustic bridge over a brook makes a charming scene for children from five to ten years of age. One or two sheets of zinc laid upon the floor will give an excellent imitation of water. The banks of the stream can be represented by some of our mats, and a few pieces of real stone will serve to hold it in place and to break up the foreground. A plank with some pine bark nailed to its front edge makes an excellent bridge when its ends are rested upon chairs that are concealed from view. Let a child sit upon this, holding a short rod in his hands, with a string dangling from it and a cork resting upon the zinc, and you have a very pretty *genre* picture of a fishing-scene. It is often possible to introduce real bushes into these composition effects, but unless your gallery is a large one I should not advise you to go too extensively into these specialities.

Snow Scenes.—Many of you have seen the really fine "made-up" photographs published by Mr. William Notman, of Montreal. They are almost all of winter hunting scenes. Many novel practices were resorted to, and much ingenuity displayed in their production. Briefly, when salt is carelessly thrown over the clothing and accessories you have a very good imitation of snow. Falling flakes of snow can best be imitated with the aid of one of the little bottles such as perfumers, druggists, and barbers use for scattering essences. You fill it with a solution of Chinese white instead of perfume, and, squeezing a spray of it into the air, hold the varnished side of your negative half vertically under the falling drops. The effect is naturalistic in the extreme. I was told by one of the *employés* of the establishment that the camp-fire effects were produced by placing a magnesium lantern in the centre of the group.

FOREIGN NOTES AND NEWS.

ERRATUM IN LAST WEEK'S *NOTES.*—DR. BOETTGER'S JUBILEE.—GLYCERINE CEMENT.

OWING to a clerical error made by the present writer in the first paragraph of *Foreign Notes and News*, in last week's number, "*talc*" is mentioned amongst the adulterants of wax along with rosin, stearine, &c. The list ought to read starch, flour, gypsum, pipeclay, sulphur, rosin, stearine, and *tallow*. In the table which follows, the ridiculous statement is made that the melting-point of pure talc is 37° to 40° C. That should, of course, also be read "pure tallow melts at from 37° to 40° C.", and wherever else in that unfortunate paragraph the word "talc" stands "*tallow*" ought to take its place. The error in question was not observed in time for correction, as the Journal had already gone to press.

The well-known chemist, Dr. Rudolph von Boettger, of Frankfurt-am-Main, who has rendered so many services to chemistry, photography, and the allied sciences, has just celebrated the fiftieth anniversary of his appointment as professor of chemistry and natural philosophy to the *Physikalischen Verein zu Frankfurt.* The celebration took the form of an academical banquet, at the close of which the learned doctor was decorated with the insignia of the order of the Red Eagle on behalf of the Emperor of Germany, and presented with a valuable silver tea service by his friends and pupils. Representative deputations from many universities, academies, learned societies, and corporate bodies took part in the festivities.

The *Rep. de Pharmacie* gives a formula for a glycerine cement suitable for cementing all sorts of metals, even in the form of pumps and steam boilers, as it can withstand the action of a temperature of 275° C. It may also be used as type for galvanoplastic purposes, as it reproduces with delicacy and fidelity the surface of the copy, and is easily made a good conductor. Before the application of the cement the parts that are intended to be dense should be carefully cleaned and coated with dilute glycerine. The cement, as it comes into the market, is made by mixing ordinary glycerine with the greatest care with washed and sharply-dried litharge, in such proportions as to form (according to the purposes for which it is required) either a stiff paste or a thickish liquid, which quickly hardens into a homogeneous mass.

ALL IN A CARTE.

SCENE—*The Waiting Room of a Publishing Photographer's. Popular Celebrities discovered in Readiness for their Sittings. Enter* Mrs. Peacock, *who is received by* Polite Employé *at the door.*

POLITE EMPLOYÉ: We are rather busy this morning, madam; but, doubtless, you come by appointment?

Mrs. Peacock: Certainly *(giving pasteboard).* Here is my card.

Polite Employé (looking at his list): Oh, yes, of course, the lovely Mrs. Peacock! I trust, madam, that you have brought a ball dress with you? Mr. Kammerer particularly wishes to take at least one of the portraits in *décolleté* costume.

Mrs. Peacock: My maid has, I believe, the larger part of my wardrobe in boxes in the hall.

Polite Employé: A thousand thanks, madam! Mr. Kammerer will have the honour to attend upon you immediately.

Aristocratic Bride (in white satin and orange blossoms): I trust that Mr. Kammerer will see me as soon as possible. I have been waiting here for some time.

Polite Employé: Certainly, my lady, certainly. But you see there will be a greater demand for Mrs. Peacock's *carte* than for yours for the moment. Mr. Kammerer thinks it better to keep your ladyship's picture back until after your ladyship's marriage. It will be published simultaneously with the account of your ladyship's nuptials and wedding presents in the morning papers.

Aristocratic Bride (with an unpleasant look at Mrs. Peacock*):* I can't help feeling that Mr. Kammerer is neglecting me for others.

Polite Employé: On the contrary, my lady, Mr. Kammerer is most anxious to take a really popular portrait of your ladyship. He has ordered a special background, representing the castle in which your ladyship purposes spending your honeymoon.

Mrs. Peacock (with a scornful glance at Aristocratic Bride*):* I must have a castle in the background, too! If Mr. Kammerer does not provide one, I shall go off at once to Messrs. Strutt and Stareleigh. They have been boring me for weeks to give them a sitting.

Polite Employé: Certainly, madam. You shall have any background you please; although Mr. Kammerer thought that perhaps the seashore would be appropriate to one of your *cartes*—with, perhaps, a bathing-machine in the middle distance.

Clerical Dignitary: I hope Mr. Kammerer will not keep me waiting *much* longer. I have a missionary meeting to attend, and—

Polite Employé: Certainly, my lord. I think you wish to be taken in your vestments. (Clerical dignitary *looks displeased.)* I beg pardon. I was mixing up your lordship with the Ritualists. I should have said lawn-sleeves.

Miss Sallie Plantagenet, née Sarah Snooks (entering briskly): Now, then, young man, look sharp! I have got a rehearsal on at the Revelry Theatre at eleven, and I shall only just have fifteen minutes to slip on my togs, give the guv'nor a sitting, pop into my brougham, and get to the stage door in time to save a fine.

Aristocratic Bride, *Mrs. Peacock*, *Clerical Dignitary* } together: { Surely, Mr. Kammerer will not presume to give this young person a sitting before any of us.

Miss Sallie Plantagenet: Come, I say, who are you calling "a young person?" As young as you please—but person, indeed! I am sure my *cartes* sell just as well as Mrs. Peacock's, or any of the swell beauty-women; and as to the Bishop's, why he's just nowhere. But there, don't let's quarrel. I daresay this young man will settle it for us somehow. Won't you, my dear?

Polite Employé: Certainly, madam, I hope your ladyship will excuse the delay. *(To* Mrs. Peacock *and* Aristocratic Bride): Oh, pray don't think of going, ladies. Mr. Kammerer will be so distressed, and the public will be so disappointed! Oh, do think of Mr. Kammerer and the public!

Miss Sallie Plantagenet (good naturedly): Don't get the poor young man into trouble. And why should you and me quarrel (*to* Bishop), when we shall be all next door neighbours in the shop windows for the next two years? (*To* Aristocratic Bride): Look here, you are ready, and she (*pointing to* Mrs. Peacock) is readier than me, as *I* have to make up my face and get into my never-mention-'ems, so you two shall be taken first; and, by the time you are done, the Reverend gent and me will be ready. There, that's real jam! Don't you see—while Kammerer is knocking off your two be-oo-tiful nobs, the Bishop can be putting on his lawn sleeves, and I can be getting into my tights.

(Scene closes in upon the arrangement.)

—Punch.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 12 ..	Photographic Soc. of Gt. Britain	5a, Pall Mall East.
,, 13 ..	Glasgow	172, Buchanan-street.
,, 13 ..	Cheltenham Amateur..........	Savings' Bank.
,, 14 ..	Manchester	Memorial Hall, Albert-square.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE monthly meeting of this Association was held on Thursday evening, the 31st ult., at the Free Public Library, William Brown-street,—Mr. H. A. Wharmby, President, in the chair.

The minutes of the previous meeting were read and passed, and Mr. W. D. Meade was elected a member of the Association.

Mr. J. A. Forrest exhibited some fine photographs of lake scenery, and Mr. Potter and Mr. Clarke showed a number of capital pictures taken during the summer.

The Secretary called attention to two prints from the same negative by Mr. W. E. Potter. One print was from a negative before it had been improved; the other from the negative after it had been varnished on the wrong side with matt varnish and then painted with a wash of yellow water-colour over the heavy shadows, foreground, &c. By these simple means a result had been obtained which made a decidedly more artistic and beautiful picture.

Mr. W. H. Kirkby read a short paper *On Recovering Waste Silver in Printing* [see page 532], and the Rev. H. J. Palmer one on *A New Cure for Blurring.* [See page 517 in last number.] Several negatives illustrating the latter paper were handed round, but it was thought that the cure was not an absolute one.

The Secretary exhibited some prints and a negative to show the qualities of the "Waverley" plates.

The Rev. H. J. Palmer showed some prints from Swan's plates, which indicated the advance that had been made in dry plates in being able readily to secure pictures including children and animals. Mr. Palmer also showed some capital transparencies from Swan's plates developed with the ferrous oxalate developer, and recommended it highly. He had used the developer over and over again for at least fifty negatives during the past six weeks, only once restoring its vigour by boiling down. It worked then as good as ever, being kept in order by adding pieces of iron wire to the solution.

It was announced that the Association would take part in the intended associated *soirée*, to be held before the close of the year in St. George's Hall.

Mr. L. W. Weber exhibited the Chadwick oxygen generator, and illuminated by it the sciopticon. The Rev. H. J. Palmer also showed by its aid a large number of transparencies which he had mentioned in his late paper on *Switzerland from a Photographic Point of View.*

After hearty votes of thanks to the Rev. Mr. Palmer and Mr. Weber, the meeting was adjourned to the 28th ult.

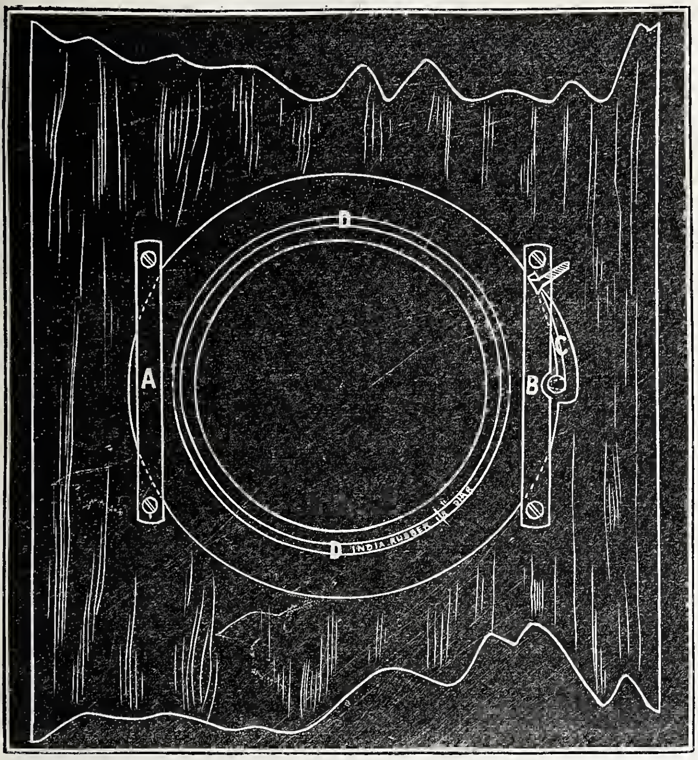
Correspondence.

IMPROVED CAMERA FRONT.

To the Editors.

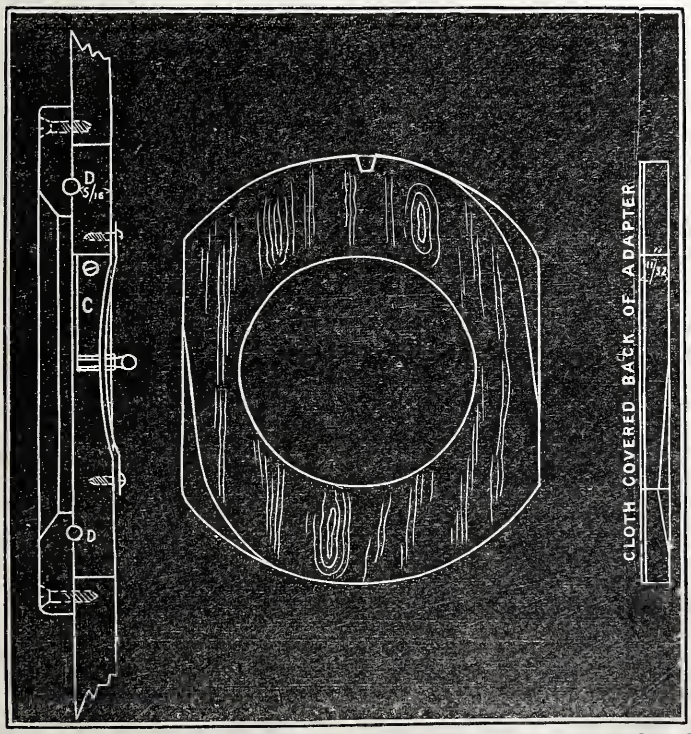
Gentlemen,—I herewith enclose a plan of an arrangement for camera front and adapters. Having made one and used it, and being perfectly satisfied with it, if you think it would be interesting to the readers of the Journal you are quite welcome to publish it.

ELEVATION OF CAMERA FRONT.



The brass plates A and B are slightly curved inwards to act as springs to keep the adapter against the india-rubber ring D. The adapter is secured when in position by a spring catch C, on which is a projecting button by which the spring may be released.

VERTICAL SECTION. ELEVATIONS OF ADAPTER.



The adapters are made of mahogany, backed with cloth and slightly chamfered at opposite corners (as shown in the plan), so as to pass under the side springs A and B.—I am, yours, &c., Sam. Bamforth.

Hollingworth, Hadfield, Manchester, November 5, 1878.

THE BRISTOL SOCIETY'S REPORT.

To the Editors.

Gentlemen,—I write from Paris (where I have had The British Journal of Photography forwarded) to set at rest the mind of your disinterested and affable correspondent, the "Peripatetic Photographer," who, I am glad to see, regrets the expected loss from your columns of our Society's proceedings and discussions.

But we are not going in the slightest degree to lessen the contributions to your Journal of our reports of proceedings; they will continue as before, our own Association journal being a separate and additional (not substituting) matter.

With kind regards to your jolly old "Peripatetic," who is so fatherly,—I am, yours, &c., H. A. H. Daniel,

Paris, November 6, 1878. *Hon. Sec. B. and W. of E. A. P. A.*

"A NEW STUDIO."

To the Editors.

Gentlemen,—My old friend Werge has discovered a "mare's nest.' If he will consider the above heading as equivalent to "a newly-built studio" he will see all I mean. I know well the principle is "as old as the hills." Besides seeing Mr. Werge's studio I have inspected two others before building mine.—I am, yours, &c., Samuel Fry.

Surbiton, November 5 (Guy Fawkes' Day), 1878.

Miscellanea.

Photography in Court.—At the Bloomsbury County Court, on Friday last, the 1st inst., the case of Watkins *v.* Hooper was heard before the presiding judge to recover the sum of £1, being the alleged balance due by the defendant to the plaintiff. The plaintiff (who conducted his own case) stated that he was a photographer residing in Bristol, and during the defendant's residence at Newport he (the plaintiff) was instructed to enlarge a certain family portrait, and to colour it in oil. After executing the order he sent it to the defendant, accompanied by an invoice for the arranged price, £6. No complaint was made; but in August last year he received from the defendant, who now resides in Great Portland-street, London, a cheque for £5, which was acknowledged. He (the plaintiff), however, on reference to his book, found that the defendant still owed him a balance of £1, for which he applied, and, not receiving any satisfactory reply, the present proceedings were brought.—The defendant said no charge was agreed upon, but he sent to the plaintiff the cheque in full satisfaction of his claim, and he could prove by the evidence of skilled witnesses that such sum was a sufficient payment.—At this stage of the case his honour said he need not do so, as the plaintiff, by accepting the cheque and cashing it without returning it, in point of law received it in full satisfaction. Judgment was entered for the defendant, with costs.

A Photographic Recollection.—The imagination of some people is simply wonderful. Those who are familiar with the comedy of *Masks and Faces* will find this fact strikingly illustrated. We have in mind something similar. To copy, finish in ink, and frame a picture of an elderly lady was our order. We had executed the first and second stage of the work; but, before framing it, the parties came to see if it was all satisfactory. It was not. The son of his mother said "the hair came down too low on her forehead, and the chin was not double enough, and it seemed to him that the laughing line at the left corner of the mouth was a little too deep." The daughter, who seemed to remember her mother very well, said "that, somehow or other, it kinder did and didn't look like her." The faults her brother mentioned she couldn't agree with. "Mother never had no double chin, nor no laughing lines around her mouth; and as to her hair, which was nothing but a wig, she always wore it very low to cover up a scar." She thought, "if anything, it was too much like the copy, and didn't have mother's expression at the time she died!" We assured the gentle critics that, by calling a few days later, we would try their suggested alterations, and hoped to answer their very reasonable requirements. The time passed so rapidly that, amid other engagements, we forgot the promised changes until the morning it was to be called for, so, slipping the picture under a mat and into the selected frame, awaited the second examination and verdict. We were just in the "nick of time," for our customers stood before us at the counter. Holding up the maternal features in a good light, we watched the play of expression which came and went and came again, till both they that were divided at the first conference were now of one mind, to the effect, that the alterations made had rendered the picture so "natural like that it seemed as though mother would speak!"—*Anthony's Bulletin.*

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Wanted to exchange, a splendid first-class electric machine, ebonite disc on mahogany stand, for a tourists' pocket set of apparatus.—Address, D. B., 248, High-street West, Sunderland.

A good half-plate copying camera, with slide, screen, and a full-plate glass bath, with dipper and box, offered in exchange for a good three and a-half inch condenser, suited for enlarging.—Address, J. R., 11, Briggs-street, Arlington-street, Salford.

ANSWERS TO CORRESPONDENTS.

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

Notice.—Each correspondent is required to enclose his name and address although not necessarily for publication. Communications may, when thought desirable, appear under a *nom de plume* as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.

PHOTO-MECHANICAL CORRESPONDENCE.

Lex.—The patent is no longer in force.

S. Smith.—Your stone was probably too hot, and the gelatinous coating was certainly thicker than necessary.

Zinc Biter.—Typographic etching on lithographic stone was practised by Senefelder and the earlier lithographers. Many attempts have been made to revive it, but metal plates appear to be better adapted for this kind of work.

David.—You must not expect to get over all the difficulties of lithography without careful study. The works of Senefelder and of Hullmandel can be consulted at the Patent Office library, or you may be able to get second-hand copies. Lithography has only been brought to its present state of perfection after many failures and patient investigation.

GENERAL CORRESPONDENCE.

Errata.—In our article on *The Surfaces of Film Supports* in last number, page 517, second column, line nine, for "and" *read* "as."

M. J. R.—Chloride of strontium is soluble in water, alcohol, and probably many other liquids.

F. R. S.—1. The book is scarcely worthy of the reputation of its author.—2. Try Messrs. Beneman and Wilson, Philadelphia.

W. Weston.—Both dealers named are highly trustworthy, and either will serve you to the best of his ability. We speak from personal knowledge.

G. T. C. B.—Let the camera be stationary, and mount the mirror equatorially. This will provide an enlarging camera possessing a maximum degree of comfort and excellence—so far, at anyrate, as concerns the nature of its construction or design.

F. M. S.—The two ladies cannot possibly be the same, notwithstanding the similarity of the name. The one enclosed by you seems young and fair, whereas the other is —— well, we are not judges of feminine charms, and may be trenching upon dangerous ground.

Fred. (Jun.)—1. You are quite mistaken in your estimate of the photographic ability of the official alluded to, for he is a skilful manipulator.—2. About one drop of castor oil to the ounce of collodion will be found a very good proportion for use in the preparation of enamelling collodion.

T. O'Hara.—Water alone is incapable of dissolving so much bichloride of mercury as will be requisite in bleaching the picture. It will be better for you to make a saturated solution of the salt in hydrochloric acid, and then add water sufficient to reduce it to a working degree of strength.

Wm. Robinson (Liverpool) writes as follows:—"I beg to request the favour of your attention to the enclosed advertisement, issued by a local firm recently established here, in connection with a 'bazaar' or 'sale of work,' for some religious object, which has lately been held in this town." [The advertisement contains the following statement:—"A diploma of merit has just been awarded to Don Levie and Cheetham by the committee of the present Paris Exhibition for high-class portraiture. They are the only Liverpool photographers so honoured."—Eds.] Mr. Robinson continues:—"Is the 'diploma of merit' referred to something outside (inferior or superior to) the awards at the Paris Exhibition, as given in the Journal? Have their names been accidentally omitted by the 'P. D.'? Or is it a mere assertion made to impress the public with the superior excellence of this particular firm's work as compared with that of other local photographers? I am led to ask these questions in consequence of not being able to find any mention of the said award in the pages of the Journal."——Upon receiving this note we immediately consulted the official list of awards, of which we possess a copy, and not only do we not discover the name of the firm in question in connection with any *awards*, but we do not find the name either of the firm, or of any of the individuals composing it, among the exhibitors in *any* of the sections. It is, therefore, evident that a serious inaccuracy exists somewhere.

G. (Liverpool).—We have submitted your print and letter to an experienced carbon printer, and he says that the fault lies in the negative, which has not been sufficiently intensified. By practising with a somewhat strong negative you will be certain to succeed. The indications in the print enclosed warrant this assertion.

Major Foster.—In reply to your query: it has, we believe, been ascertained that a negative nitrate of silver bath may be kept a long time in a paraffine-coated wooden bath-holder without its qualities becoming impaired. We cannot say how long this continues, but it is worthy of a careful trial to ascertain the precise value of the statement.

George Spence Dobson makes a suggestion relative to the construction of lenses possessing a greater degree of rapidity than usual. Divested of extraneous matter it consists in making the lenses of a larger diameter than is commonly the case, while grinding the surfaces to the same curves as are adopted in the smaller lenses. The lenses, he observes, would of necessity be thicker, but this would not prove of any disadvantage if the glass were pure.—To the foregoing we reply that the principle suggested is that which has always been adopted in the construction of portrait lenses possessing an abnormal degree of rapidity, some slight modification of the curves being necessary to meet the altered circumstances. We infer from the remarks of our correspondent that he is a practical optician; if so, we should be glad if he constructed such a lens and let us know to what extent he finds it necessary to depart from the curves requisite for the smaller lens.

M. Shelley (Bowdon) desires to submit the following queries to our readers. He says:—"I wish to know what form and aspect of studio it would be best to construct on a piece of land having a north frontage to street of eighteen feet, and a depth of four feet? There are one-storied buildings on either side, and in the rear a two storied building—all adjoining the land. The street is about forty feet wide, and on the opposite side of the street there are two-storied shops. The following considerations have to be borne in mind:—1. The direct rays of the sun to be prevented entering the studio through the top light without the aid of curtains.—2. The studio to be large enough to take full-length pictures, from *carte* up to whole-plate sizes daily, and often up to 12 × 10 inches, or, at least, 10 × 8 inches.—3. What is the best kind of glass for the studio? and what the size of panes?—4. Dimensions of lights to be stated in feet.—5. A due regard to appearance desired. As some of your numerous readers may have had special experience under similar circumstances to the above, and as the information sought for may be of equal utility to others as to myself, I shall be greatly obliged by your insertion of this brief note. Any original or practical information will be highly valued."

The Photographic Exhibition.—The Exhibition at 5a, Pall Mall East, will remain open the whole of next week, the last day being Saturday, November 16th, and *not* Tuesday, November 12th, as previously announced. The Exhibition has been enriched by a collection of views in Cyprus, recently taken by Mr. John Thomson, F.R.G.S.

South London Photographic Society.—On Thursday next, the 14th inst., at seven o'clock, this Society will hold its annual Technical Exhibition meeting at the House of the Society of Arts, Adelphi; admission free. Also, on Saturday, the 16th inst., the annual dinner of the members and friends will take place at the Café Royal, Regent-street. Further particulars of both these meetings can be obtained of the Hon. Sec., 57, Queen's-road, Peckham.

Photographic Society of Great Britain.—The first meeting of this Society for the winter session will be held on Tuesday next, the 12th inst., at the Exhibition Gallery, 5a, Pall Mall East, when the presentation of the medals awarded will take place. A paper, by Mr. Leon Warnerke, will be read, entitled *Photographic Notes from Travel in Russia, with the Exhibition of various Works, Apparatus, and Materials.* Also, will afterwards be read *Photographic Experiences in Cyprus*, by John Thomson, F.R.G.S.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.
For the Week ending November 6, 1878.
These Observations are Taken at 8.30 a.m.

Oct.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
31	29·85	—	44	36	38	39	NW	Overcast
Nov. 1	29·92	—	49	37	40	42	NE	Overcast
2	30·11	—	48	35	36	38	NNW	Cloudy
4	29·82	—	44	32	35	36	NW	Overcast
5	29·80	—	45	34	38	41	NE	Fine
6	29·57	—	46	35	37	41	NW	Overcast

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 967. Vol. XXV.—NOVEMBER 15, 1878.

OUR FORTHCOMING ALMANAC.

The Editor of The British Journal Photographic Almanac desires it to be known that he is now actively engaged in the compilation of this favourite annual and handy-book of reference in every branch of photography. In order that it may be at least equal, if it do not surpass, its predecessors, he takes this opportunity of requesting the numerous readers of The British Journal of Photography kindly to favour him with such hints, "dodges," items of experience, notes on difficulties encountered and overcome, as well as their ideas on subjects possessing general interest to those who study photographic literature, as will enable him, with their assistance, to render the Almanac for 1879 successful in every respect. It will enhance the kindness rendered by such responses if the Editor be favoured with contributions at the *earliest possible moment.*

The Publisher desires to repeat the fact that as an advertising medium the Almanac is without a rival; and, being retained as a standard work of reference in photographic matters, advertisers will find their announcements more permanent than in the case of serial publications, while it is also true that the Almanac finds its way into many studios and on to the library tables of amateurs where the usual weekly journals may fail to gain regular recognition. For these reasons it is recommended to the notice of advertisers as the most valuable existing medium for popularising their various business announcements. Terms and other information may be obtained at the Publishing Office, 2, York-street, Covent Garden, W.C., or from the advertising columns of this Journal. Immediate applicaton is absolutely necessary in order to secure priority of position.

A NEW POINT OF DEPARTURE IN THE PREPARATION OF EMULSIONS.

The difficulties which have been experienced in securing certain qualities in washed emulsions have, we fear, led to the almost total neglect of other properties equally important but in another direction. In plain words, in our endeavours to secure density and facility of development we have come, unconsciously perhaps, to disregard the more easily-obtained physical characteristics which go to form a perfect film.

We are led to make this remark from an examination not only of commercial films and emulsions, but also of different samples of pyroxyline specially prepared—or, at least, specially sold—for emulsion purposes. The defects to which we allude in the case of commercially-prepared films and emulsions are not, perhaps, very marked, because the reputation of the maker depends upon his supplying a good article; and hence he is obliged, for his own sake, to pay attention, not only to one particular property, but to the general quality of his preparations. In the case of pyroxyline, however, it is extremely easy to lay the blame of any deficiency in quality on the clumsiness or ignorance of the user; and that faults *are* found with commercial pyroxylines supplied for the special purpose we speak of none of our emulsion workers nor, we dare to say, the dealers in pyroxyline will be inclined to deny.

Formerly the great complaint was, in this connection, want of density. Now, however, this quality is readily obtainable, but, as we have hinted, at the expense of physical properties equally important. The fault is not, perhaps, very noticeable where small plates are concerned, but when large ones are in question it becomes painfully evident. We need only go a week or two back to quote from our own columns the experience of a gentleman who had to wash off a number of 9 × 7 films on account of a defect arising from "something wrong with the pyroxyline;" and we have very little doubt that many similar complaints remain unpublished.

What may have been the particular fault in the case to which we allude we do not know; but the form in which we have met with it is a deficiency in fluent properties in the emulsion and a want of homogeneity in the film obtained therefrom. Speaking of the latter, the evil may take a variety of forms—mottling and wavy markings, reticulation, granularity, liability to spots, and even drying marks may be classed under the same head. None of these, however, singly form the subject of our complaint, but rather an intimate mixture of nearly all of them. Briefly stated, it may be described as a crapy sort of reticulation over the whole film, with a strong tendency, especially in large plates, to mottling at the thicker end of the plate. The emulsion flows with difficulty, as if the solvents were overloaded with solid matter, and sets with the peculiar "lumpy" appearance which is usually the sign of weak solvents. The reticulation, it may be noted, does not take the form of transparent lines, as in the case of a rotten collodion, but the opposite; the fine lines forming the network are denser than the remaining portions of the film.

The emulsion is, in fact, too thick; but that the lack of fluency does not come from excess of solid matter is easily proved by the fact that dilution with fresh solvents only mitigates, without removing, the evil. Further: we have experienced the difficulty in its most glaring form when employing solvents of a far higher grade than there is any necessity to use when things are going smoothly; we may, therefore, set on one side any suspicion as to the presence of water being the inducing cause, and, in fact, we fall back upon the inevitable conclusion that there is "something wrong with the pyroxyline."

The latter substance has formed the subject of careful research at the hands of many experimentalists during the last five-and-twenty years, and from one point of view may be said to be pretty thoroughly understood; but we are far from believing that the rules laid down for its preparation for use in the wet process are to be relied upon for dry-plate work; while for emulsion work there can be little doubt that we are as yet scarcely past the threshold as regards our knowledge of the special requirements. The fault lies in this: in endeavouring to obviate the difficulties or deficiencies in the preparation for a special purpose we resort to the means we should adopt under entirely different circumstances, losing sight of a new set of conditions which belong to the particular purpose we have in view. Thus, wanting density, we resort to high temperature or to an increase in the proportion of sulphuric to nitric acid in the preparation of the pyroxyline, either of which conditions undoubtedly favours density *per se*, and also, as any one who has made comparative experiments in the manufacture of pyroxyline for emulsions will acknowledge, introduces complications of a physical nature. In the course of a somewhat extensive series of experiments in the manufacture of the soluble basis of collodion from various materials—cotton, hemp, linen, woody fibre, paper, &c.—we found that temperature and the proportion of the acids were by no means to be relied upon to produce a uniform effect as regards density, while the vagaries in the matter of physical properties were something surprising; and we must confess our inability to prepare a really uniform and *thoroughly satisfactory* product from any written formula. In view of this somewhat discouraging state of affairs we set ourselves to work in another direction to overcome the physical defects of the emulsion film; and while we attained a large amount of success in that direction we also developed some new facts which caused us considerable surprise, and which we are sanguine in believing will throw a new light upon the requirements in the preparation of emulsions.

The first and most obvious way of treating an emulsion which flows too thickly is to dilute it by the addition of fresh ether and alcohol; but this plan, though it may secure a more even film, produces so thin a layer of the sensitive material that a vigorous image becomes almost an impossibility. We have then to turn in another direction, and, looking at the pyroxyline as the ingredient which is inimical to the quality of the film, to consider how far its proportion may be reduced without bringing about a similar result as regards thinness and poverty in sensitive material. By merely decreasing the actual quantity of pyroxyline contained in each ounce of emulsion we may easily produce a thin and even film; but then the result is little different from that obtained by simple dilution of the emulsion already formed. What we have to do is to counteract the increased transparency by augmenting the quantity of silver bromide held in suspension, so that the thinner film may possess the same degree of opacity, and may contain an equal quantity of silver, as the thicker film obtained under other conditions.

Now, it has generally been accepted as a fact that a certain quantity of pyroxyline to the ounce of solvents is necessary to the formation of an emulsion of fine grain. We know that plain solutions of silver nitrate and a soluble bromide, if mixed, produce a precipitate of bromide of silver too coarse to be utilised in the formation of a photographic film of any practical value; but by dissolving one or other of the salts in a viscous solution, such as collodion or gelatine, we have the bromide precipitated in a state of extremely fine division; and it is reasonable to suppose that in proportion to the density or viscidity of the vehicle so will the fineness of the precipitate vary. To a certain extent this may be true; but our preconceived notions on the subject received a rude shock when we found that a collodion bromised with the usual quantity of salt and sensitised with its due equivalent of silver, but containing only *two* instead of five or six grains of pyroxyline to the ounce, produced an emulsion as fine and clear as if the full quantity of cotton had been used.

Encouraged by the success of this result we next attempted the increase of the proportion of silver bromide to pyroxyline, and without going into minute details we may say that we have succeeded in producing a satisfactory emulsion with such widely different proportions as a grain and a-half of cotton and fifteen grains of soluble bromide to the ounce of solvents. This, however, is perhaps overstraining the powers of suspension, but to produce a really workable film two grains and fourteen grains, respectively, work admirably, producing a film equally free from any granularity on the one side or structural defects on the other; in the latter respect, indeed, the result is equal to a gelatine film without its density.

So much for the purely physical view of the matter. Turning to the chemical or photographic phase the difference is still more surprising. An emulsion composed, as above stated, of two grains of pyroxyline and fourteen grains of double bromide of cadmium and ammonium to each ounce of solvents and sensitised with twenty grains of silver produced a film at least *four times as sensitive* as a washed emulsion prepared with a similar excess of bromide, but with six grains of cotton to the ounce. This result, too, was obtained only three hours after sensitising—a period which, under ordinary circumstances, would be wholly inadequate to the proper combination of the salts.

The first plate developed from the new emulsion, and which had received the same length of exposure under a negative as a plate prepared for comparison from another sample, gave a result which, at first sight, appeared to be hopeless fog. But a careful examination of the film led to the suspicion that the fault was *over-exposure*, not *fog*; and after three or four trials we found that *one-fourth* of the exposure gave a *better* exposed result than the comparison plate. Exposure under a negative by gaslight is not, we are bound to confess, a sure criterion of the relative sensitiveness in the camera; but if there be any difference we are inclined to think that it will be even more in favour of the new emulsion than we have stated. We have the following grounds for saying this:—The negative employed—one which we are in the habit of using for test purposes—includes a white building in strong sunshine. The deposit in this portion of the picture is, as may be well imagined, of great density; but in a good light a great deal of fine detail may be *seen*, though we have never before, even upon paper, succeeded in making it *print*. The new emulsion, however, with the shortest exposure we have mentioned, succeeded in bringing it out without, at the same time, overdoing the other portion of the picture; and this, we think, is fair evidence of sensitiveness to feebly-illuminated details, if any analogy exist between superposition printing and camera exposures.

A strong tendency to abnormal reduction or *fog* is evident if the strength of the alkali be too great. A moderately-strong ammonia developer may be allowed to remain on the plate for a considerable time without producing any reduction if the light be really non-actinic; but by slightly increasing the quantity of alkali the *unexposed* film may be reduced completely through its whole thickness.

If any of our readers doubt the correctness of the theory that has been propounded as to the restraining action exercised by the collodion film, we do not think a stronger argument could be brought in its favour than the behaviour of one of these films—rich in bromide, but poor in pyroxyline; and we have a strong impression that something may be done towards increasing the rapidity of collodion emulsions by working in the direction we indicate, while the gain in the physical qualities of the film (supposing that due intelligence be exhibited in the preparation of the emulsion) will be sufficient to recommend the change, if no other advantage accrue.

THE PHOTOGRAPHIC EXHIBITION.

[Concluding Notice.]

During the whole series of exhibitions of the Photographic Society of Great Britain the Autotype Company have never exhibited grander works than those to be found in the present one, nor pictures possessing a higher degree of refinement. The eight pictures contributed by this Company bear evidence of the important status at which the art of enlarging has arrived. The place of honour at the north end of the gallery is allocated to a magnificent enlargement (110)—from a negative by Messrs. Downey—of one of the popular "beauties" of the day, whose face is familiar to those who examine the pictorial displays in the usual dealers' establishments. The picture of *The Culvers, Carshalton* (157), one of the largest in the room, is also one of the most perfect. A small sheet of water in the foreground was so still during the photographic operations as to give the most charming reflections of the house, which is lighted under those conditions said by Rejlander to be indispensable for securing the finest effects, namely, a sky obscured by light clouds during the greater portion of the exposure, with a slight dash of sunshine towards the close to impart character and force to the high lights. The *Great Hall, Mentmore* (251), from a negative by Lemere and Co., is another work of great merit, although it is apparent that the negative possessed a greater degree of intensity than would have been necessary in order to produce the finest and softest result.

We cannot conceive of a more effective portrait than the profile enlargement of Professor Max Muller (281), by Messrs. Lock and Whitfield. This firm also exhibits other portraits equally perfect as regards the technics of photography; for example, *The Bishop of Lichfield* (305), *Portrait of a Child* (315), and others.

The Woodbury Company exhibit very largely, and if their works were removed from the gallery the Exhibition would suffer a sad deprivation. Some of their enlarged architectural views are singularly delicate, and display most eloquently what *can* be done in the way of enlargements. Who, after seeing the picture of the *Church of St. Rouen* (121), with its soft and beautiful carvings and tracery, would ever even attempt to produce such a work direct by means of a large camera? Possessing similar characteristics is the front view of *Rouen Cathedral* (317), which is replete with fine gradation. In no respect inferior to these works are the charmingly-executed portrait enlargements of this firm. The *Portrait of a Lady* (267), one of the largest pictures in the gallery, is nearly life-size, and admirable from its many excellent qualities. The large portraits of *H. J. Byron* (78), and *Henry Irving* (130), are also exceedingly fine. That of the latter gentleman is enlarged from an original to be seen in the highly-useful "educational" frame exhibited by the Woodbury Company—a frame which contains the engraved metal plates from which the choice specimens of photographic printing in juxtaposition were produced. Their frame of works, adapted for book illustration (321), show the capabilities of the Woodbury process for this branch of work. The purity of the tones is charming, and the quality, as a whole, has been such as to secure for this collection the medal of the Society.

Another exhibitor whose works impart a peculiar charm and value to the Exhibition is Mr. Payne Jennings, who, as heretofore, confines himself to landscape, as in contradistinction to portrait, photography. This skilful artist has of recent years adopted a rich bistre tone in his landscapes—an example which, we find, is being followed by several amateurs. The large frame, or joined series of frames, numbered 231, contains twelve of the choicest examples of this artist, and these immediately arrest the eye of the visitor upon entering the gallery. These charming works represent, respectively, scenes in the English lake district and in Ireland. Several pictures by the same artist are "mounted" singly in carved gilt frames—a peculiarity in this style consisting in there being no margin, indeed none of the mount, shown. Mr. Jennings also exhibits two frames of photographs mounted as, and intended for, book illustrations. For his frame of *Instantaneous Effects* (199), representing a number of yachts and other vessels in motion, he has most worthily been awarded a medal.

Of the exhibits of Mr. Leon Warnerke too much cannot be said as regards their educational interest to photographers; for, culled from the works of eminent photographers in Russia, they enable us to see many peculiarities in style and treatment that might, with advantage, be imported into our home practice. The grouping of some, the peculiar effects of sunlight of others, of the numerous groups and *genre* photographers here brought together by this skilful collector, must exercise an influence for good upon every photographer who carefully studies this remarkable collection. In this series we have admirable specimens of photographic engraving, lichtdruck, surface-block printing, photolithography, "hyalotype," and of ordinary photographic printing, representing character studies of figures, groups, landscapes, and architecture. The artists by whom these have been executed are Scamoni, Carrick, Kareline, Srezniewsky, Lewitzky, Denier, Jæger, Felish, Sapteff, Classen, and Reinhardt. We may add that Mr. Warnerke is entitled to the thanks of the Society for having contributed so valuable a collection of pictures to this year's annual display.

The Exhibition is announced to close tomorrow (Saturday) evening.

A PLEA FOR EXACTITUDE.

In the course of conversation with photographers having a large staff of operators, printers, &c., they have not infrequently complained to us of the irregular results that were sometimes observed in a day's work, both in the operating-room and the printing department; while, among those amateurs whose time for photographing is limited to an occasional afternoon, the most common complaint is the uncertainty of processes in their hands. But this need not, and should not, be. In an important branch of science, looking at photography from its physical aspect, for the results to be uncertain and the exact conditions governing them unknown or neglected is most unworkmanlike, and can have no other tendency than to degrade the importance of photography in the eyes of scientific workers generally.

The vast progress made in chemical science, for instance, during the last few years would never have been achieved had no more attention been paid to rigid exactitude than is commonly given in the practice of photography; neither would the marvellous commercial production of complicated chemical substances have arrived at its present stage of magnitude and excellence if the strictest watch had not been kept at every stage of the process to ensure scrupulous attention to the carrying out of all the necessary conditions. But in even the largest photographic establishments how rare is it not to find such cases! How many operators and printers use their thermometers, their hydrometers, or the simplest form of *burette?* Rule of thumb prevails almost universally, with the result of many thousands of pounds' worth of material being wasted beyond redemption. True it is everyone knows that in cold weather his chemicals require strengthening, and that in hot weather stains are apt to occur, and some little alteration is made by guesswork to bring things right.

What is required, however, is a set of tables for strengths of various solutions required for different temperatures, a few days' rigid examination of results under such varying conditions as are likely to occur, and such a tabulated statement of them as would enable each to alter for himself the chemicals he is using, or know from their strength and temperature the effects he is to expect, thus establishing the routine of operating on a thoroughly sound basis.

We may give an example of what we think ought to be possible in the hands of an ordinary and careful manipulator. Every morning he would take the temperature of his dipping-bath, and, as the strengthening or weakening of that solution would take up time, he would best bring it to a uniform temperature, which could be very easily done; but if time or circumstances prevented that being accomplished, he would refer to his table and find for a given temperature what was the equivalent strength, and could then vary his developer according to the table—a definite alteration in strength of which would be given for (say) each two degrees of temperature. Working with a collodion of uniform quality he would then know at once what would be his results. Then, again, every few days, more or less, according to the greater or less work the bath has had, he might test its strength, and bring it up to the exact strength he considers best. He would also be able by previous experiment to have a rule for determining the effect of an excess of ether and alcohol in the bath (on this subject we shall dwell in a future article). And so, in the printing department, when the greatest irregularity usually is found, his table would show him what difference in strength would be equivalent to a fall or rise of a degree or two in temperature, and every time he prepared for floating the paper he would bring up the temperature or add strong solution of silver in cold, or *vice versâ* in hot, weather. The effect of an alteration of a few degrees in the temperature of the printing bath is most marked. So, again, in making his gold toning bath: if he make it of an acid sample on one occasion and nearly neutral on another, he must expect to find want of uniformity of result; but if he make his gold as nearly neutral as he can before adding his alkali he will know exactly how it will tone.

These remarks are merely meant to give what we might term the skeleton of "practical" modes of introducing exactitude in all departments, and the preparation of such tables as we suggest would only require very careful attention and comparison of results. One set of tables would in practice suffice for all photographers; and, when they were really fairly applied in daily routine, their broad bearings would be thus learned by heart to an extent far more exact than the practical knowledge of even the most experienced operator—so much so that it would only be when results of especial exactitude were required that anything like "calculation"—the bugbear of the rule-of-thumb manipulator—would be needed.

We should like to see our ideas practically worked out, for we are assured they would add not a little to comfort in working and to the economy of materials.

RECENT PATENTS.

No. XXI.—CADETT'S PNEUMATIC SHUTTER.

We have already [see page 240, *ante*] given a description of the method of using this ingenious lens cap, for which, as our readers are aware, a medal has been awarded at the Photographic Exhibition now open. The specification of the patent having been published, we are now enabled to follow up that description with another in which the mechanical details of the invention form the leading feature. The patentee, Mr. James William Thomas Cadett, says:—

My invention has for its object the application of pneumatics for photographic purposes, so that the lens, by means of a shutter or other covering, is uncapped or exposed at will, according as required.

In carrying out my invention I adopt substantially the following arrangements:—

To a portion of the apparatus holding the lens I fit or secure a case or box which contains a bellows or wind-box acted on by spring or otherwise, said bellows being in communication with a pipe or opening into the pneumatic tubing.

On a spindle acting on or by the said bellows is fitted or secured a shutter or cap, which projects beyond the said case or box.

The action is as follows:—By pressing an air or gas chamber in communication with the tubing the bellows or case fitted or secured to the apparatus is actuated, and the shutter or cap is moved, so as to uncap or expose the lens as required.

The bellows, disc, or chamber can be fitted to the photographic apparatus without a case, and springs may, as is evident, be sometimes dispensed with, though a spring or springs are preferred to be used.

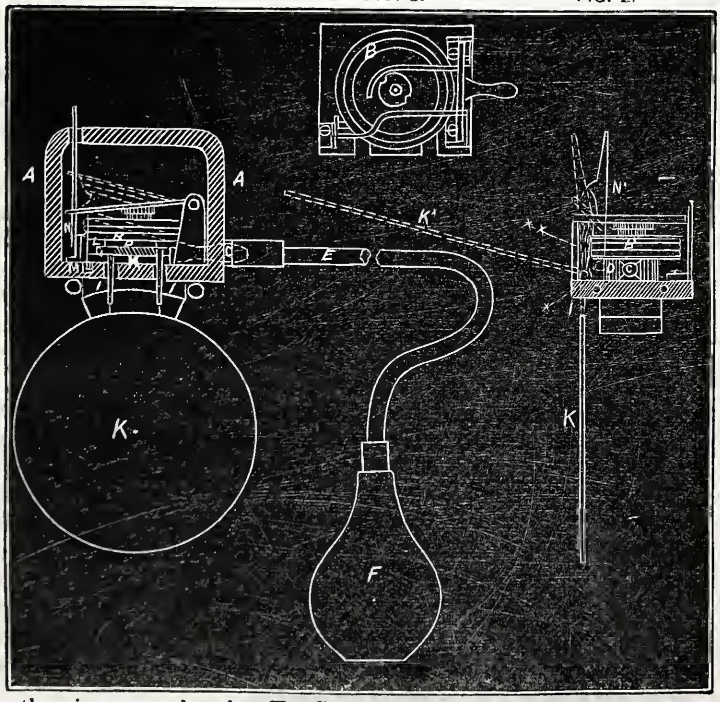
A locking arrangement is generally used, which holds the shutter or cap so as to keep the lens uncovered while setting the proper focus.

Having thus far described the nature of the said invention, and incidentally intimated in what manner the same is to be performed or carried out in practice, I will now proceed (aided by the accompanying drawings) to further and particularly describe and ascertain in what manner the same is to be performed or carried out in practice; that is to say:—

Description of the Drawings.—*Fig.* 1, front view of my improved pneumatic arrangements for photographic purposes (with case in section); *fig.* 2, side view without case; *fig.* 3, top plan without case.

A is the case or box fitted or secured to the portion of apparatus holding the lens; B, bellows or wind-box; C, pipe secured to portion D, said pipe being in communication with the bellows or wind-box; E, length of tubing fitted on to said pipe C, terminating

FIG. 1. FIG. 3. FIG. 2.



in the air or gas chamber F; G, spindle fitted in bearings, as shown, said spindle being provided with a spring H; I, arms secured to spindle G, said arms being fitted with the cap or shutter K; L, connection formed between the arm M fitted to spindle G and the portion pressing on the bellows or case B, whereby the shutter or cap, when the bellows is inflated, turns the spindle G, and with it the shutter or cap K, to the position shown by dotted lines in *fig.* 2.

By releasing the pressure on the air or gas chamber F, the bellows, chamber, or disc assumes its normal condition, as shown in the drawings.

N is the locking arrangement for holding the shutter or cap.

The arrangements shown by the drawings represent those for adoption outside the camera. When fitted inside the arrangements are substantially the same, with the exception of means suitable for attaching the instrument, which are modified according to the kind of camera used.

At *, *fig.* 2, the position of the arm M and connection L is shown by dotted lines as holding the shutter or cap K closed, and the locking arrangement is then at N×.

In the same *fig.*, at ××, the dotted lines show M and L as when holding open the shutter K× for focussing, the locking arrangement being then as at N.

Having now particularly described and ascertained the nature and object of the said invention, and in what manner the same is to be performed or carried out in practice, I hereby declare that I claim the invention of new or improved pneumatic arrangements (substantially as hereinbefore set forth and described) for facilitating the uncapping or exposing and capping or shutting the lenses used in apparatus for depicting persons or objects by photographic means, it being understood that I do not bind myself to the particular form of arrangements shown by the accompanying drawings and herein described by reference thereto, as same may be varied without departing from the principle of my said invention.

We take our leave of this invention by remarking that it is one of the most ingenious of the many ingenious mechanical inventions made in connection with photography, and we know that our opinion is shared by all who have seen it in action.

NOTES ON STAINING GELATINE FILMS.

[A communication to the Bristol and West of England Amateur Photographic Association.]

Blurring being a defect common to most emulsion plates—particularly when prepared with a bromide alone—has given rise to numerous expedients for its cure, that most employed being a backing of a non-actinic colour which is usually applied in the form of a mixture of gum with some brown or red pigment, a small quantity of glycerine being added to allow of its more easy removal during development.

Commercial gelatine plates are not usually supplied with a backing, and for most purposes it is unnecessary; but, when long exposures to objects presenting great contrasts have to be given, these plates, particularly if thinly coated, are very liable to halation, and some satisfactory method of obviating it is very desirable.

A coat of paint on the back of the plate is both troublesome to apply and remove, and I am not at all certain that it is thoroughly efficacious. The more simple plan is to introduce the colouring matter into the emulsion. This idea is not new, as I believe Colonel Stuart Wortley's uranium plates were similarly dyed. The objections that may be alleged against this proceeding are impaired sensitiveness and the difficulty of removing the colouring matter from the negative. That the first exists in some degree there is but little doubt; but with the exalted sensitiveness we can obtain with gelatine emulsion a slight loss of rapidity is but of little importance, especially as the subjects most liable to blurring do not usually require a very rapid plate. Indeed I may add that my experiments in this direction were made with a view to reducing sensitiveness, as I have found that very rapid plates are unsuited to the generality of landscape work.

I first tried the aniline dye, aurine, employing a solution of eight grains in an ounce of alcohol. Of this half-a-drachm was added to each ounce of emulsion. When dry the resulting films were of a rose-pink colour, though why a golden-coloured dye in combination with yellow bromide of silver and gelatine should possess this appearance I am at a loss to explain. This colour completely disappears during development, the negative presenting no appearance of having been dyed.

Although aurine appeared to be in every way satisfactory, with the exception of the slight effect on the sensitiveness of the plates, still, as a vegetable dye might prove equally useful, and perhaps be more convenient, I concluded to try turmeric. A strong decoction in alcohol was made, and half-a-drachm added to each ounce of emulsion.

The addition did not cause any curious change of colour as in the case of aurine, the original yellow colour of the emulsion merely becoming deeper. The sensitiveness of the plates did not appear to be as much affected as when the aniline dye was used; but the great objection to the use of turmeric is that the colour does not disappear from the negative during development, but necessitates a soaking in alcohol to remove it.

I regret that I am unable to exhibit any negatives in illustration this evening, not having brought any over from Ireland.

J. D. Lysaght,
Lieut. Royal Madras Fusiliers.

COMMON GAS AS APPLIED TO PHOTOGRAPHIC PORTRAITURE.

I have been greatly interested in the article on *Taking Portraits by the Electric Light,* which appeared in last number. Indeed, in my opinion, it is impossible to overrate the importance of being able to take photographs from living subjects without the agency of daylight or sunlight. "Art" may be "long;" but most assuredly a November day is very short and its light most feeble and exceedingly unstable. *Now,* we may be basking in sunshine; but in a moment we may be enveloped in a brown, murky fog. How to render ourselves independent of such a state of matters is a question of vital importance to numerous photographers beside those who reside in the great metropolis, where fogs, during certain seasons, most undoubtedly do hold high revelry and become changed into the blackest of atmospheric surroundings.

In the place where I have recently been residing the opportunities for forming an intimate acquaintance with the capabilities of common house gas have been most abundant, and I desire to direct attention to this kind of illumination as one which, in my opinion, is quite possible to develope into what may be advantageously adapted for photographing the "human face divine."

Carburetted hydrogen, although possessing a fair degree of illuminating power, is sadly deficient in those rays which permit photographs to be taken. To prove that even the brightest gaslight is of a decidedly yellow colour all that is necessary is to ignite a few inches of magnesium wire or ribbon, the pure light from which will, by contrast, show the other to be of the colour to which I have alluded.

My efforts in the direction of rendering house gas suitable for employment in the production of photographs were first of all begun by rendering the flame white. To this end, after devising various forms of "blowers" for the purpose of securing a large volume of heated air to impinge against the flame and thus whiten it, I found eventually that, as a preliminary, it would be necessary to carbonise the gas to a much greater extent than is at present the case. It may not be known to many readers that if the gas in common use be passed over the surface of certain hydrocarbons just before it emerges from the orifice of the burner its illuminating power is greatly increased. Patents innumerable have been obtained in connection with this simple fact, and very many appliances for securing its full benefit have been proposed, and in several instances introduced; but the gas companies and those interested have hitherto successfully discouraged their general adoption.

The means by which success might be achieved may be ascertained from a recital of the expedients to which I have resorted. A circular tin box was procured, four inches in diameter and two inches in depth. In this were fixed two pipes, one of them—the supply pipe—entering the bottom, and the other emerging from the top. The inside was stuffed very loosely with torn scraps of felt; and by means of an orifice in the tap, closed by a screw—such as can be obtained from any dealer in lamp furnishings—a quantity of coal naphtha was poured in, sufficient to thoroughly impregnate the felt scraps, and to allow the little vessel to remain half full besides. As the gas was admitted near one margin of this carburetter, and passed out at the other, it had to find its way through the naphthalised stuffing, by which means it became highly charged, or enriched, by the hydrocarbon, and yielded a flame far surpassing in intensity that which it afforded in its unaltered state. Upon applying a gentle heat to the carburetter the gas was enriched to such a degree as to smoke in an offensive manner when burning.

My next step was to have constructed a suitable burner for the ignition of the carbonised gas, and I eventually adopted one of the Argand form. But even with this class of burner I could not get the smoke of the flame consumed—nor indeed did I desire to do so—by means of atmospheric air alone. I preferred, instead, to convey into the interior of the burner a very gentle stream of oxygen, which immediately gave an intensity to the flame greater than I had hoped to secure. Not only was the flame rendered very intense, but it was whitened to such a degree as to render it apparent that it would prove most useful for photographic purposes.

Its value having been ascertained from a few practical trials, it was considered that six such lights would prove sufficient to illuminate the human figure for the purpose of producing a well-exposed negative in a reasonable time. These burners were mounted, slightly detached one from the other, upon a light framework of wood, each light having been placed in a reflector not greatly unlike those used in coach lamps. The whole of the burners were supplied with oxygen from one pipe, and the oxygen was turned on only when the picture was about to be taken.

The photographs obtained by means of the apparatus here described have proved, in a satisfactory manner, that good portraits may be taken by means of common gas, provided the latter be considerably enriched by being brought into contact with a suitable hydrocarbon before ignition, and oxygen be introduced to the flame to render it pure in colour.

I would have given a detailed description of my burner, but I am engaged in making a modification in its form by which I hope to obtain such an increase of light as to enable me to work with an exposure of twenty seconds, which at present I cannot do. Instead of naphtha as the fluid in the carburetter I have tried others with advantage. Benzole gave good results, but at present I am most favourably disposed towards oil of turpentine.

It is, perhaps, rather premature for me to have made public my experiments; but I have elected to do so in order that others may also be induced to make experiments in this most fertile, but as yet uncultivated, field of research. Alfred Irvine.

A CURIOUS INCIDENT IN CONNECTION WITH PAPER ENLARGEMENTS.

[A communication to the South London Photographic Society.]

A few days since, at a committee meeting of the South London Photographic Society, I happened to mention a curious circumstance which had occurred to me, and it was then suggested that, as none of the gentlemen present could account for it, I should bring the matter before our meeting tonight. This, with your permission, I shall now be happy to do.

A short time ago I was engaged making a developed paper enlargement by artificial light, and had sensitised the iodised paper and exposed it whilst wet in the usual way, when, much to my surprise, directly the developer came in contact with the paper the sheet assumed a brown colour, which so rapidly darkened that in less than a minute the entire surface was a beautiful purple-black.

Now, the paper used was part of a batch iodised some time before, and the developer a portion of ordinary stock solution. The sensitiser, however, I found had been made from a fresh parcel of silver, and, curiously enough, the glacial acetic acid was the first taken from a Winchester only recently supplied by a well-known firm.

The fault then clearly rested either with the silver or the acid. Another sample of silver and the same acid produced similar results; but the same sample of silver, and acid obtained from another source, cleared up the difficulty, and everything worked as usual.

I will just show you the sort of pictures I generally obtain when working in a similar way, and also two specimens of the blackened paper, to endeavour to find out the cause of which I have brought the matter before you.

We have usually considered glacial acetic acid as an article rarely contaminated with anything injurious to photography, although occasionally the most peculiar results have been attributed to it—none, possibly, much more curious than that to which I have just alluded. F. A. Bridge.

JANSSEN'S NEW METHOD OF SOLAR PHOTOGRAPHY.

In two papers published respectively in the *Comptes Rendus* for December, 1877, and in the *Annuaire* of the *Bureau des Longitudes* for the current year, M. Janssen has described a new method of photographing the solar disc, which he has successfully carried out at the Meudon Observatory, during the past twelve months; and he has also drawn attention to some striking features in the constitution of the photosphere, disclosed for the first time in the beautiful pictures which are among the first results of his process. These may be regarded as only the forerunners of further important discoveries. Through the courteous liberality of M. Janssen, I have lately had the advantage of studying the process in the Meudon Observatory, and a description of its distinctive features, and a brief notice of such of the results as

M. Janssen has already published, will certainly be acceptable to many who are interested in the recent developments of solar physics, and have not ready access to the original papers.*

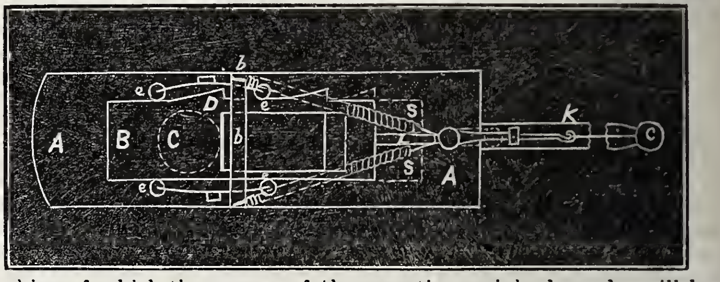
M. Janssen's pictures of the solar disc are distinguished from all those previously obtained with the photoheliograph, not only by their great size (30·5 centimetres diameter), but more especially by the remarkable sharpness and definition with which they display the details of photospheric structure, which are such that, for the purpose of their more effective study, it is found advantageous to enlarge the original pictures to three and even nine times their original linear dimensions. The greatly-extended means of research which M. Janssen's invention places in the hands of the solar physicist will be obvious when we consider the difficulties which attend any prolonged ocular inspection of the solar disc, hitherto the only practicable method of examining its detailed structure. "In spite of the interposition of coloured glasses, helioscopes, &c., the eye must seize on the details in a dazzling field, and perform its functions under conditions which are quite unfamiliar. The true variations of luminous intensity in different parts of the image can no longer be appreciated, and the impressions produced do not correspond to reality. Thus may be explained the diversity of the opinions which have been put forward respecting the forms and dimensions of the granulations, and of the constituent parts of the solar surface"—diversities well illustrated by the old controversy of the "willow-leaf" and "rice-grain" bodies in the photosphere. In M. Janssen's pictures the forms, sizes, and arrangement of the bodies described under these appellations are exhibited in the most satisfactory manner, and as, in a favourable state of the atmosphere, the pictures may be repeated at as short intervals as the operator pleases, the movements and changes of form exhibited by these bodies may be studied with the utmost ease in a register which preserves the most fugitive phases of their appearance, and is available for leisurely re-examination at any future time.

Before noticing the novel facts which M. Janssen has thus brought to light I will briefly describe the principles of the process itself. The main difficulty to be surmounted in order to obtain a sharply-defined photographic picture of the details of the solar disc is presented by the phenomenon known as photographic irradiation, in virtue of which a brilliantly-illuminated surface occupies, on the negative picture, a proportionately exaggerated space, its borders being extended over the darker objects around. This phenomenon, M. Jannsen remarks, "is very striking in all the photographs of total eclipses which have been obtained since 1860, which exhibit the images of the protuberances encroaching on the lunar disc, to the extent in some cases of ten and twenty seconds of arc, and even more." The granulations (to employ M. Janssen's terminology) visible on the solar disc have a mean diameter of not more than one second of arc, and in ordinary photoheliograms their very existence is therefore completely masked by irradiation.

The simple and beautiful contrivance by which M. Janssen has succeeded in getting rid of irradiation is to restrict the photographic action to one small sheaf of rays of the spectrum, viz., those which extend from the line G a short distance towards H. In a series of experimental photographs of the spectrum, which M. Janssen took in my presence (with calc-spar prisms and a rock-crystal lens), and in which the time of exposure was varied successively from two-thirds of a second to three minutes, those obtained with the shortest exposure represented only that part of the spectrum immediately contiguous to G and extending a short distance towards H, and in this the spectral lines were exhibited with extreme sharpness. With a more prolonged exposure the range of the image was greatly extended in both directions, accompanied by intensified action in the G-H region, which impaired the local definition.† Taking advantage of this fact, in the new process, the collodionised plate is exposed to the sun's action only so long as to allow of the action of the most actively photographic rays, and this is the cardinal condition of success. In practice the duration of the exposure is restricted to between $\frac{1}{2000}$ and $\frac{1}{3000}$ of a second in summer, being varied according to the season and to the time of day. The means by which this delicate adjustment is effected and verified will be described presently.

A second condition is so to adjust the distance of the sensitised surface from the lens of the instrument that it shall exactly coincide with the focus of the G rays. The necessity of this precaution will be readily understood when it is borne in mind that no lens is perfectly achromatic, and that, in virtue of the first condition, the rays in the vicinity of G alone produce the image. The remaining conditions are the adoption of as large a plate as can be readily manipulated, and some improvements in the process of preparing and developing the plates, whereby a very perfect surface is ensured for the reception of the image, and a graduated development after exposure.‡

The photoheliograph employed was constructed specially for the Meudon Observatory by M. Prazmouski, of Paris. It has an object-glass of five inches diameter, and a reversing ocular, giving an erect image on the sensitised plate. The finding telescope casts an image on a disc of ground-glass; by observing which, the operator can judge the exact instant for releasing the sliding screen, which causes the instantaneous exposure of the sensitised plate. At present the position of the telescope is adjusted by means of winches worked by hand. The construction of the sliding screen, on the accurate adjustment and



working of which the success of the operation mainly depends, will be understood on reference to the accompanying rough diagram (which, however, is not drawn to scale, and in which, to avoid confusion, some of the minor details are omitted). A A is an oblong brass plate which serves as a frame for the mechanism, and is introduced through a slit in the side of the telescope, exactly at the spot where the real image is formed by the object-glass. At the spot where the image falls the plate is pierced with a circular aperture somewhat larger than the image, shown by the dotted circle C. But this is completely covered by the sliding screen B, excepting such portion as is momentarily uncovered by the transverse slit D, in its passage across the image. The width of the slit D can be varied by means of a micrometer screw, which is omitted in the diagram. The sliding screen works between four small grooved wheels *e e*, fixed to curved springs, which press them against the edges of the screen-plate; and one of these edges is shaped in the manner shown in the diagram, so that the pressure is increased from the instant at which the slit D reaches the margin of the circular aperture C, neutralising the acceleration of the movement by the continued action of the springs, and rendering it uniform during the passage of the slit across the image*. Thus the image is allowed to fall on the sensitised plate—not as a whole, but in successive slices; and the width of the slit is so adjusted to the rate of motion that each slice is exposed during from $\frac{1}{2000}$ to $\frac{1}{3000}$ of a second only. The motion of the screen is effected by three spiral springs, two of which, S S, are shown in the diagram (the central spring being omitted). The fixed ends are attached to a bar *b b* screwed to the slide A A, the free ends to a stud on the bar *l* which projects from the proximal end of B, which is bent twice at right angles and terminates in the hook *k*. In setting the screen, before operating, a loop of twine is passed over the hook, which is then drawn towards the clip *c*, extending the springs S S, and bringing the screen into the position shown by a dotted line on the diagram. The twine is made fast in the clip *c* and all is in readiness for the operation. At the critical moment the retaining string is cut and the slit D is rapidly drawn by the tension of the springs across the field, till checked by a stop not shown in the diagram. The movement of the screen is generally horizontal, but a gravity compensation is attached which can be employed when the movement is vertical.

The rate of the movement and the uniformity of the motion are determined by attaching, by means of wax, to any part of the sliding screen a glass slip coated with lamp-black. A tuning fork, with an attached bristle, being made to vibrate transversely to the movement of the screen, the latter is released as in the actual operation of photographing; and the length of the wave marked by the bristle on the carbonised surface, multiplied by the width of the slit D and divided by the number of vibrations of the fork per second, gives the duration of the exposure, while the uniformity of the movement is tested by the equality of the wave-lengths, which correspond to the passage of the slit D across the circular aperture C. By this means the uniformity of exposure can be regulated to $\frac{1}{10000}$ of a second.

In order to obtain the exact position of the sun's axis on the plate the instant of the exposure is noted by the chronometer, and the exact level of the slide containing the sensitised plate is observed with an accurate clinometer before removing it from the camera.

As M. Janssen has pointed out, the chemical preparation and development of the plate require very great care in order to obtain the requisite sharpness of detail. The gun-cotton for the collodion is prepared at a high temperature (70° C.), and numerous precautions are taken to ensure that the collodion film shall be perfectly even and free from the smallest speck of foreign matter. The image is developed gradually, beginning with a solution of ferrous sulphate, and, after thorough washing, completing with a solution of pyrogallic acid, after which the image is strengthened with a mixture of pyrogallic and silver nitrate solutions.

* The present notice contains a more detailed description of the process than M. Janssen's original papers, and is published with his full approval and authority. With characteristic liberality M. Janssen writes:—"Quant au procédé lui-même, il est evident que toute personne un peu au courant de la photographie astronomique pourra l'appliquer et obtenir bientôt des photographies semblables à celles que nous obtenons. Je serai aussi très probablement devancé sur plusieurs points de la constitution du soleil que ces procédés peuvent révéler. L'inconvenient n'est què pour moi, et je crois qu'il vaut mieux dès aujourd'hui livrer la méthode au public scientifique. Les progrès de la science y gagneront certainement."

† Owing, probably, to spherical aberration.

‡ In this part of the process M. Janssen acknowledges the assistance of M. Arents, to whom the writer is also indebted for much information.

* This, M. Janssen suggests, may be otherwise effected by an arrangement which will arrest the action of the springs at the instant when the slit reaches the margin of C.

In a favourable state of the atmosphere the pictures thus obtained leave nothing to be desired in point of sharpness and definition of detail. But, as a matter of course, all states of the atmosphere do not permit of equal success, the process being subject to the same atmospheric contingencies as in all astronomical work with the telescope. The best results were obtained in the late autumn and during this last spring.

The character of the photospheric surface, as displayed in the new photographs, will be best described in a translation of M. Janssen's own words :—

"The photographs show that the solar surface is covered everywhere with a fine granulation. The forms, dimensions, and arrangement of the granular elements are very varied. Their size varies from some tenths of a second to three or four seconds. The shapes are circular or elliptical, and more or less elongated; but often these regular forms are more or less distorted. The granulation is exhibited everywhere; and, at first sight, it does not appear to present a different constitution towards the polar regions. But this is a point to be further investigated. The illuminating power of the granular elements, taken separately, varies much; they appear to be situated at different depths in the photospheric layer. The most luminous of them—those which more especially contribute to the luminosity of the photosphere—occupy but a small fraction of the surface of the sun.

"But the most remarkable result yet obtained, and which is exclusively due to the employment of the photographic method, is the discovery of the photospheric network *(réseau photosphérique)*. An attentive examination of the photographs shows that the photosphere has not an uniform structure throughout, but is divided into a series of figures, more or less distant from one another, and exhibiting a special constitution. These figures generally have rounded contours, but also often rectilinear and sometimes polygonal. Their dimensions are very variable, and they sometimes attain to a minute or more in diameter. While, in the intervals between these figures, the grains are distinct and definitely bounded, although of very variable size, in their interior the granules are half obliterated, drawn out and confused; most frequently, indeed, they have disappeared, giving place to trains of matter which replace the granulations. Everything indicates that, in these spaces, the photospheric substance is subject to violent movements which have confounded the granular elements. * * This fact enlightens us as to the forms taken by solar activity, and shows that this activity is always very great in the photosphere, even though there be no spot visible on the surface. I will further draw attention to this very important fact, of which very distinct evidence is furnished by certain photographs, viz., that numerous very dark points appear in the regularly granulated tracts, indicating that the photospheric layer can have but a very small thickness."

In another paper M. Janssen deduces some further conclusions of interest. He observes :—

"If the solar layer which forms the photosphere were in a state of repose and perfect equilibrium, it would result from the fact of its fluidity that it would form a continuous envelope around the solar nucleus; the granular elements would be confounded together, and the lustre of the sun would be uniform in all its parts. But the ascending gaseous currents do not admit of this state of perfect equilibrium. They break up and divide the fluid layer, escaping at a great number of points. Hence results the formation of the granular elements, which are but so many fractions of the photospheric envelope, and which tend to take a spherical form, in virtue of the gravity of their constituent parts. * * But even this state of equilibrium of the individual parts is but rarely realised; in numerous points the currents drag along with them the granular elements, and these latter lose their spherical form, and eventually become no longer recognisable where the movements are most violent. * * Moreover, in the regions of relative calm, the movements of the photospheric medium do not allow the granular elements to arrange themselves in an even layer, whence results the greater or less immersion of the grains beneath the surface, and, consequently, owing to the great absorptive action of the medium, the great differences of their lustre shown in the photographic pictures. * * We may further conclude, from the fact of the relative rarity of the most luminous grains in the photographs, that the illuminating power of the Sun is due principally to that of a small number of points on his surface. In other words, if the solar surface were completely covered with granular elements of equal brilliancy with these its illuminating power, according to a first approximate estimate, would be from ten to twenty times greater than it is."

It will be interesting to ascertain, at the next epoch of sun-spot maximum, whether the brilliant granules occupy a relatively larger proportion of the solar disc than at the present time. The direct evidence which such an observation will afford on the important question of the periodic variation of solar radiative intensity—a question on which much diversity of opinion still exists—will be of the highest value.—*Nature*. H. F. Blanford.

THE REACTIONS OF CHROMIC ACID AND CHROMATES UPON SUBSTANCES OF ORGANIC ORIGIN, CONSIDERED WITH REFERENCE TO THEIR USES IN PHOTOGRAPHY.*

Influence of the Aqueous Contents of the Chromated Gelatine upon its Sensitiveness to Light.

The aqueous contents of chromated gelatine has a great influence upon its sensitiveness. It is, therefore, maintained that the sensitiveness of the aqueous, and of the already-stiffened but still moist, chrome-gelatine is extremely small by the side of the same mixture when dry. Gelatine films dried in air are, however, by no means free from water, of which, indeed, they contain on an average about seventeen per cent. By storing them in places the air of which contains varying quantities of moisture the aqueous contents of the gelatine also vary without changing its appearance, and even without swelling it up. Such gelatine films are usually spoken of as "dry," and it is of the influence of the varying proportions of moisture in them upon the properties of the chrome-gelatine that I shall speak here.

I find the idea that carefully-dried chrome-gelatine is considerably more sensitive than less dried is generally accepted. It is also the case that tissue is less sensitive ten or twelve hours after being sensitised than twenty-four hours after[1]. Sensitised tissue is most sensitive on the third or fourth day after sensitising; the cause of this phenomenon is complex, and no longer depends simply on the degree of dryness, but partly on the commencement of insolubility, as I shall show[2].

I determined the influence of moisture on the behaviour of chrome-gelatine in the following way :—Some carbon tissue was sensitised upon a three-per-cent. solution of bichromate of potassium and dried by twelve hours' exposure to air, but in the dark. It was then divided into three parts, one of which was placed in a desiccator over calcic chloride; the second was placed in another desiccator, the bottom of which was covered with water; and the third was simply kept in air. In these conditions they remained thirty-six hours, and were then—that is, two whole days after being sensitised—exposed with a continuous wide photometer of tissue paper. The result was extraordinary. The tissue which had been kept under the bell glass, over water, always showed one distinct photometer degree more than that of the air-dried; while that kept in the desiccator, though distinctly less sensitive, was yet scarcely a whole degree behind the air-dried. The tissue kept over water was, therefore, the most sensitive; that kept over calcic chloride in an atmosphere free from moisture showed itself the least sensitive; while the air-dried stood between the two others. The repetition from day to day of the same preparation, exposure, and development gave no variation from these results. On the fifth day, however, the air-dried paper had printed to the eighth degree of the photometer, while that kept over calcic chloride had only reached the sixth degree, and that over water the ninth degree. Their solubility was on that fifth day equally various. The tissue dried over calcic chloride and that dried in air developed perfectly in water of 30° C.; while that which had been kept damp could only be developed by water of from 50° to 60° C., at which temperature they were all three placed upon a flat sheet of glass, when the two former were found to have already lost two photometer degrees of density—that is, they were reduced to the sixth and fourth degrees. The tissue that had been in the desiccator, over the calcide chloride, remained the most soluble, and the spontaneous insolubility which had set in in the tissue stored over water had not attacked the driest at all.

In order to learn the influence exerted by this beginning of insolubility upon the sensitiveness of the chrome-gelatine, and to eliminate the influence of the moisture, which for the moment hindered it from setting in, I made the following experiments on the sixth day with the same tissue :—I placed tissue No. 1, which had lain five days over calcic chloride, in the bell glass, the bottom of which was covered with water. No. 2, a piece of the same, I exposed to air; and I left No. 3 over the calcic chloride. No. 4 was a piece of air-dried paper, which I placed over water. No. 5 was the same over calcic chloride; and No. 6 I left in the air. No. 7, tissue from the atmosphere saturated with moisture, I left there. No. 8, a piece of the same, was exposed to air; and No. 9, still a piece of the same, was placed over calcic chloride.

When these pieces of tissue were next day exposed simultaneously under the same photometer and then developed I found that No. 7 had printed to the thirteenth degree, No. 8 to the twelfth, No. 9 to the tenth, No. 5 to the seventh, Nos. 2 and 3 to the fourth, No. 1 to the fifth, and No. 8* between the fifth and sixth degrees. With regard to their solubility, Nos. 7, 8, and 9 were most insoluble; then came No. 4; and the others were about all equally soluble. On the seventh day the experiments were discontinued because the dampest tissues had so far lost their solubility that they could no more be clearly developed.

From these figures it will be distinctly seen that chrome-gelatine is most sensitive when it has lain some time in an atmosphere saturated with moisture, and least sensitive when kept in absolutely dry air, in which it also becomes so brittle and hard that it can neither be rolled up nor laid out flat without breaking. I ought, however, to say that the gelatine films dried for a week over calcic chloride had not even then given up all their water, but that they still retained some four or five per cent., which was only given off by heating to 120° C. With such perfectly-dry chrome-gelatines no experiments could be made, as at 120° C. they became thoroughly decomposed and insoluble. The temperature of the dry thermometer in the dark room in which the tissue was kept was during the experiment on an average 17° C.; that

[1] *Photo. Mittheilungen*, vol. xiv., p. 98. Sawyer.

[2] It is recommended that in order to work with all security, chrome-gelatine films (carbon tissue, &c.) should be used twenty-four hours after sensitising, but it may be kept perfectly fit for use until the third or fourth day.

* Note by Translator.—In the German version there are two Nos. 8, the second of which, probably, should be No. 6.

* Continued from page 520.

of the wet thermometer was 13° C., which indicated that the air of the room contained sixty-one per cent. of water, and that the atmospheric pressure was equal to 8·8 millimetres. The pressure of the bell enclosing the air saturated with moisture was 14·4 mm. The temperature of the well-closed room was liable to slight variations of + 0·5° C.

I have spoken of this experiment at some length, because my deductions are directly opposed to the prevailing idea that "the drier the chrome-gelatine the more sensitive it is." I found that *air-damped*[1] chrome-gelatine is more sensitive than either air-dried or over-calcic-chloride-dried, though this phenomenon was first manifested when very carefully observed.

Chrome-gelatine, more or less swollen up with water, is much less sensitive than "dry" films in the ordinary sense of the word; therefore the gelatine should not contain too much water, but merely what it would naturally absorb of the aqueous vapour present in air of an ordinary temperature.

From the foregoing the following simple but practically important rule may be deduced:—Sensitised chrome-gelatine should be kept in as dry a place as possible, so that it may remain long unchanged, but before exposing it should be placed for some time in a damp atmosphere (over a vessel containing water, or in a cellar, &c.), which will render it more sensitive. At the same time, in the case of carbon tissue, it acquires a greater pliability, owing to the moisture absorbed, which renders it very agreeable to handle without going so far as to make one fear that it would adhere to the negative. It is, of course, understood that one must avoid making the gelatine sticky by using water vapour of too high a temperature. Jeanrenaud's[2] observation that perfectly-dry tissue gives flat pictures and that the prints are improved if a piece of damp paper be laid upon the back of it, and Liesegang's[3] and Gentile's[4] perfectly-correct observation that carbon tissue is more sensitive in damp weather than in dry, are explained by the above. According to Waldack,[5] also, tissue is more sensitive in damp than in very dry weather. He attributes this partly to the slow drying, but he also mentions that it depends less upon that than upon the degree of moisture in the air. He says that very dry, brittle tissues are less sensitive than those which are damp and pliable. Lichtdruck plates are also, according to Waldack, much less sensitive immediately after they are taken out of the drying-box than when they have had time to absorb a little moisture from the air. This agrees exactly with what I have shown above. Lambert[6] also states that damp chromated tissue is more sensitive than dry (of course that means air-dried) tissue.

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(To be continued.)

ON PROCESSES OF MAP PRODUCTION BY PHOTOGRAPHY.*

The great difference between the photocollotype processes and lithography is that, whereas the lithographic stone receives a like quantity of ink in all parts of the image, and is incapable of producing a true and continuous gradation of shade, the moist gelatine film possesses the valuable property, not possessed by the stone, of receiving a greater or less amount of ink in different parts of the image, in exact proportion to the intensity of the action of the light upon them, and is thus capable of reproducing the most delicate gradations of shade as perfectly as they are shown in an ordinary silver print.

It will thus be readily understood that, instead of the advantages of photographic reproduction by cheap and speedy mechanical processes being confined to the reproduction of certain special subjects, they can be extended to all classes of subjects, such as photographs from nature, brush-shaded and coloured maps, MS. records, drawings, and paintings of all kinds. Even for line subjects the process surpasses most of the known processes of photo-engraving, photozincography, or photolithography in the delicacy, sharpness, and clearness with which the finest lines can be reproduced, as well as in perfect accuracy of scale, owing to there being no intermediate process of transfer, with its attendant washings and pressings, and the plate being printed by vertical pressure.

The process has the further advantage that the prints do not require mounting, and this makes it very suitable for book illustration, for which, indeed, it is now being very largely used. It is especially valuable for illustrations of a scientific character in cases where otherwise only the highest class of lithography or engraving would be applicable, and at an enormously-increased expense.

For the most successful application of the photocollotype processes to the reproduction of maps the result depends, as in photozincography, very much on the quality of the negative, and that, again, on the original.

[1] I use this expression to indicate shortly gelatine which had lain for some time in an atmosphere saturated with aqueous vapour, in contradistinction, on the one hand, to gelatine swollen up with water in the fluid state, and on the other hand to gelatine dried by the air in its normal condition (air-dried). Of course before the gelatine is laid in the damp air it must be air-dried, otherwise a certain excess of water would never disappear.

[2] *Photo. Mitthsilungen*, vol. v., p. 262.

[3] *Kohledruck*, 1877, p. 70. [4] *Photo. News*, 1877, p. 209.

[5] *Photo. News*, 1877, p. 104. [6] *Ibid*, 1877, p. 86.

* Continued from page 524.

Any negative that will give a good photographic print will answer; but the successful reproduction of shaded maps or drawings demands considerable care in the execution of the original drawing as well as in taking the negative.

One of the great drawbacks to the extended use of the photocollotype process for the reproduction of maps is the difficulty of making corrections on the plates. When the printing surface is a metal plate or lithographic stone, upon which a map has been either engraved, zincographed, or lithographed, additions and erasures may easily be made without any risk of the loss of the printing surface, or even of much damage to it. With the tender gelatine films the case is different; and, although writing or simple lines may be inserted without much difficulty, it would be almost impossible to successfully alter gradation of shade or to insert shaded details. On the other hand, the taking out of details must be done by some chemical means, which must always be attended with the imminent risk of raising the gelatine film from its support and the consequent utter destruction of the printing plate.

As maps, almost more than any other printed subject, require that it shall always be possible to make corrections on the printing plates, it is obvious that the use of any process which will not permit of this being done must be confined more to the reproduction of maps already printed or of an ephemeral character than to the preparation of new or standard ones. And thus, though photocollotype is admirably adapted for reproducing copies of old or other special maps, which are or can be finished once and for all, it is not suited for maps on which corrections are likely to be required.

With the plates prepared as described we have found that details may be inserted by two or three methods. The first is by writing in the required additions on the dry gelatine surface, using an ink composed of bichromate of potash, either alone or coloured with Indian ink. After the insertion of the additions the plate is exposed to the light for a few minutes to reduce the bichromate, and may then be washed and printed as usual; or an ink composed of solution of chrome alum may be used, and will not require exposure to light. In some cases the part to be corrected may be washed over with a solution of bichromate of potash and allowed to dry, and then the required details may be printed in from another negative.

The taking out of details is more difficult, and requires care. It may be accomplished by washing the part with a strongish solution of caustic potash or cyanide of potassium. Should a plate print dirty it may be cleaned up and greatly improved by being washed with a weak solution of cyanide of potassium, or, better, with a solution of citric acid, which not only clears up plates that print dirty but at the same time facilitates the inking in. A weak solution of ammonia is also said to be useful in this respect.

In all cases where the photographic image is impressed directly on the printing surface a reversed negative must be used, as before explained, and these are sometimes rather troublesome to produce. I have lately tried whether the use of this reversed negative could not be dispensed with in the photocollotype process, by taking the negative in the usual way direct on to the thick ground glass plate, and then, while still wet and without varnishing, coating this negative with a thin layer of any of the foregoing mixtures of gelatine, either with or without bichromate. When the sensitive gelatine coating is dry it is exposed to light through the negative on the under side and allowed to print well through the film. This plan was found to have many conveniences to recommend it, and to answer very well for subjects in line, but not for half-tones. For map work it has the undoubted advantages of perfect accuracy of scale and the greatest possible sharpness of the image.

The foregoing descriptions will give an idea of those interesting processes which are now being very largely used for producing photographic prints of all kinds, though I believe the successful working of them still presents some difficulties, even in better climates than India. Against their employment for map work on the large scale there will, however, always remain the impossibility of joining up several sections of a large map on the printing surface, the difficulty of producing the finest tints of a shaded map with a perfectly-clean white ground, and, above all, the difficulty of making additions and corrections on the plates.

Woodburytype.

We have already seen that the great drawback to the production of photographs in printing ink with continuous gradation of shade, by either photography or photo-engraving, is the necessity for breaking up the continuity of gradation by a more or less marked "grain," and that this difficulty has been overcome by the photocollotype processes.

By a very ingenious process, invented in 1864, Mr. Walter Woodbury succeeded in solving the problem in another way, and, by a mode of operation analogous to "nature-printing," has been able to produce absolutely permanent prints with such perfect photographic gradation, combined with the most exquisite transparent delicacy and richness of tone, that none but the initiated would know that they were not the ordinary silver prints.

A tissue is first made by coating a tough film of collodion with a moderately thick, even layer of gelatine and bichromate of potash, slightly coloured in order to see the progress of the development.

When dry the tissue is laid collodion side next to the negative film, and exposed to light proceeding from one direction only, in order to prevent diffused rays acting through the thick gelatine coating, and so blurring the image. This tissue of gelatine and collodion is then temporarily attached to a glass plate and treated with hot water—very much in the same way as in the pigment printing process already described. The whole of the gelatine upon which the light has not acted, and which, therefore, remains soluble, is dissolved away, leaving an image in relief, the highest parts of which represent the deepest shadows of the picture, while the parts intervening, down to the lowest, represent the intermediate gradations between the deepest shadows and the highest lights.

When dry the gelatine composing this image will be quite hard and capable of resisting the heavy pressure required to indent it into soft metal, without itself being injured.

The tissue bearing the image having been stripped from the temporary support, is laid face downwards on a sheet or block of lead or type-metal, about one-third of an inch thick, between two finely-surfaced steel plates, and submitted to the pressure of a very powerful hydraulic press. The prominent parts of the relief are thus forced into the soft metal, and produce a mould, the deeper parts of which represent the shades and the shallower the lights of the picture. As the relief obtained from gelatine and bichromate of potash alone will impart to this mould a smooth surface without grain, such plates could not be printed with printers' ink, like a copperplate engraving. Mr. Woodbury, therefore, uses a semi-transparent ink consisting of gelatine coloured with any suitable pigment.

The leaden plate or mould is laid in a suitable press of peculiar construction,* and slightly greased. A small quantity of the coloured gelatine having been poured in a liquid state into the middle of the mould, a piece of suitable paper is laid above it and pressed strongly down, so as to force the ink thoroughly into the depressions all over the plate, and squeeze out all the ink between the surface of the metal and the paper in the parts forming the highest lights of the picture. The gelatinous ink is allowed a short time to "set" and attach itself to the paper; the paper is then removed and brings with it a perfect impression of the picture in coloured gelatine, of different thicknesses corresponding in intensity and gradation of shade to the depth in different parts of the plate. The print has now only to be "fixed" in a solution of alum, and, when dry, is perfectly permanent and ready to be trimmed and mounted.

The rate of impression is about the same as of ordinary copperplate printing, and may be carried on quite independently of the light. If very large numbers are required of a single subject it is easy to produce as many printing-plates as may be required from the original gelatine relief, which may afterwards be put away and kept indefinitely. The cost of printing is exceedingly small, and prints are produced in large numbers at a marvellously cheap rate. As the process requires special mechanical appliances and apparatus, it has generally been worked on the large scale by public companies.

The Woodburytype is unfortunately not well adapted for the reproduction of maps, because it has been found very difficult to produce impressions of large dimensions, and, owing to the peculiar method of printing, it is almost impossible to obtain the clear black lines and pure white ground so indispensable in a good map. The prints also have to be mounted, which is an objection. However, in special cases where the work is within the capabilities of the process it will be found valuable, because it possesses the great advantage over the collotype processes for the reproduction of half-tone subjects—that the printing of an almost indefinite number of copies can be carried on with as perfect certainty as in ordinary lithography or engraving—while in beauty, transparency, and delicacy of gradation the Woodburytype prints are undoubtedly superior to collotypes.

J. Waterhouse, *Capt.*

(To be continued.)

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The first meeting of this Society for the winter session was held on Tuesday evening last, the 12th inst.,—Mr. James Glaisher, F.R.S., President, occupying the chair.

The following gentlemen were elected members:—Charles Bennett, Arthur Clark, T. G. Hemery, J. G. Ritchie, S. Victor White, J. E. Bliss, T. J. Dixon, W. Perry, J. G. Small, S. Wolstenholme, James Cadett, F. Downer, A. Lombardi, and W. Vanner.

The President then proceeded to distribute the medals awarded to the School of Military Engineering, Messrs. Vernon Heath, A. Wilson, George Nesbitt, Payne Jennings, J. Cadett, and the Woodbury Company. Of the gentlemen named above only two were present to receive their medals in person. After strongly commending the pictures of Mr. Charles Bennett, which had been taken by artificial light, he (the President) explained that the pictures placed in competition for the other subjects for which medals had been offered did not come up to the standard determined upon by the jurors, who, consequently, had declined to award medals in those classes; and, stating how much they were indebted to Mr. Warnerke for the display of his Russian collection, he closed by saying that emulsion processes promised a great future.

The Secretary then read a paper, *Notes on a Visit to Russia*, by Mr. Leon Warnerke. This will appear in our next number.

Mr. John Thomson, F.R.G.S., gave an account of his recent visit to Cyprus, and described graphically the circumstances under which he obtained the photographs exhibited on one of the screens.

Votes of thanks followed these two communications, upon which no discussion took place.

The meeting then assumed the form of a *conversazione*, and was soon afterwards adjourned.

* For a drawing of this press, see Abney's *Treatise on Photography*, p. 175.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The monthly meeting of this Society was held on Thursday, the 7th inst.,—the Rev. F. F. Statham, M.A., in the chair.

Messrs. H. G. Cocking and Christopher Bennell Cutchie were elected members.

The officers and members of committee for next year having been nominated,

Mr. F. A. Bridge brought before the meeting some troubles he had recently experienced. In the course of his business he had occasion to develope paper enlargements produced by the oxyhydrogen light and magic lantern. Having obtained a new sample of glacial acetic acid from a well-known firm of manufacturing chemists, every picture obtained by its agency was totally destroyed through fogging—to such an extent as to blacken the entire surface of the paper. He had noticed that the picture flashed out upon the application of the gallic acid developer, but the darkening followed immediately after the appearance of the image. He exhibited specimens of this peculiar kind of defect, and concluded by asking the opinion of the members as to the cause.*

Mr. E. W. Foxlee thought that if aldehyde were present as an impurity it would cause such a fogging as that described.

Mr. T. Bolas said that either formic acid or aldehyde would account for it.

Mr. W. Brooks suggested iron as a likely agent by which the blackening might be caused.

In reply to a question as to the possibility of making use of the acid,

Mr. Bolas said that a little nitrate of silver might be dissolved in the acid, and after exposure to light for some time a precipitate would doubtless be formed, after which it would be fit for use.

Mr. T. J. Pearsall thought that it would be doing the manufacturers a kindness to return it and explain the reason for so doing. It would enable them to trace the history of that individual sample, and thus to arrive at the cause of the defect.

Mr. F. York had at one time a sample of acetic acid which produced an effect quite contrary to that just spoken of, for one drop of it produced the same result as twenty drops of the ordinary acid. He had concluded that it was extensively contaminated with sulphuric acid.

Mr. Brooks remarked that he once had a similar experience. There was much impurity to be found in the chemicals of modern times.

The thanks of the meeting were awarded to Mr. Bridge for introducing the subject, which was then dropped.

Some discussion on the blistering of paper prints followed, prefaced by Mr. E. Dunmore giving a synopsis of his remarks on that subject at the previous meeting of the Society.

In reply to a question,

Mr. W. M. Ayres said that paper prepared with albumen which had been salted with seven and a-half grains of chloride of barium and the same quantity of chloride of ammonium to the ounce, and excited upon an eighty-grain bath, was well adapted for winter work, and gave an image which lost nothing in the subsequent operations.

Mr. Brooks considered that blisters in albumenised paper arose from the paper being too weakly salted, and used in conjunction with too strong a bath.

Mr. Payne Jennings was scarcely ever troubled with blisters except with an occasional appearance of very small ones like pimples, and even these he never saw when he resided in Dublin, which convinced him that the water made use of had a great deal to do with their formation. He used a printing bath of the strength of from fifty to sixty grains to the ounce, and after the paper had been sensitised each sheet was drawn over a glass rod to remove the superfluous solution.

Mr. Ayres said he imagined that the surface of the paper was apt to become injured by drawing it over the glass rod, but did not experience this in his own practice.

After some other observations and the transaction of private business the meeting was adjourned.

* Since the report was written we have received from Mr. Bridge a written statement of his remarks on the occasion referred to. This will be found at page 543.—Eds.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

On Wednesday evening, the 6th inst., the Exhibition at Pall Mall was open, by kind permission of the Photographic Society of Great Britain, in aid of the Photographers' Benevolent Association, attended with satisfactory results. During the evening the gallery was visited by the President (J. Glaisher, Esq.), and other eminent gentlemen connected with the profession.

On the same evening the Board of Management considered an application for relief, and granted the assistance required by the applicant.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Association was held at the Museum, Queen's-road, on Wednesday, the 6th instant,—Mr. T. Davey in the chair.

In the unavoidable absence of the Hon. Secretary the reading of the minutes was postponed till the next meeting.

Lieut. Lysaght read a paper entitled *Notes on Staining Gelatine Films.* [See page 542.] After the reading of his paper Lieut. Lysaght exhibited a gelatine film stained with aurine, and called attention to the peculiar rose tint imparted to the film by the dye, the colour given to the film being quite different to the golden colour of the dye.

Mr. E. Brightman suggested that the molecular condition of the dye in the film was such as to impart a colour to it differing in shade from a simple solution of the dye, giving, as an instance of change of colour produced by altered molecular conditions, the well-known experiment of passing a glass rod over a sheet of paper prepared with iodide of mercury, when, by the simple pressure of the rod, a molecular change is produced, resulting in the production of an altered colour on those portions of the paper where the rod had passed.

The Chairman suggested the use of an emulsion giving a thick and dense film as a preventive of blurring.

Lieut. Lysaght mentioned the use of denser films; but, although there was less tendency to blurring when a dense film was used, he preferred a thin film as less likely to blister, instancing Swan's plates as liable to blister on account of the thickness of film.

The Chairman and Mr. Brightman had both worked with Swan's plates without noticing any tendency to blister whatever, five separate batches of these plates being developed without a single blister.

After a vote of thanks to Lieut. Lysaght for his paper, the meeting was adjourned.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The nineteenth annual general meeting of this Society was held at 5, St. Andrew's-square, on the evening of Wednesday, the 6th inst.,—Mr. John Lessels in the chair.

The following new members were elected:—Mr. George Turnbull, Mr. Marshall Wane, and Mr. James Meek.

Mr. Pillans, the Honorary Secretary, then read the following

ANNUAL REPORT.

The Council, in presenting the nineteenth annual report, have pleasure in congratulating the members on the large accession to the membership and the increased popularity of the Society.

During the past year the Society has lost sixteen members by death, resignation, and removal, and sixty-six names have been added to the roll of membership. The Society now numbers a total of three hundred and forty-three.

Sixteen meetings have been held during the past session, nine of which were ordinary, three outdoor, two popular, one special, and the annual excursion.

The meetings have been well attended, and an increasing interest has been displayed by the members generally in the subjects brought under consideration.

The "popular" meetings have been largely taken advantage of by the members and their friends, and continue to be one of the interesting features of the Society's operations.

The Council regret that the outdoor meetings have not been so well attended as they deserved to be, and they hope that in future this interesting and instructive branch of the Society's work may be more largely taken advantage of. During the past session visits have been paid to North Queensferry, North Berwick, and Bridge of Earn.

A special meeting was held on the 16th November, 1877, for a practical demonstration of the working of Keevil's patent lantern, sent by Mr. F. York, of London, to whom the Society has been largely indebted for the loan of transparencies.

The annual excursion was pre-eminently successful. A company numbering over one hundred spent a most enjoyable day at Winton Castle, the beautiful grounds surrounding that fine old historical mansion having been thrown open by the special favour of Lady Ruthven.

The papers read before the Society have been chiefly noticeable for their practical character. The following is a list of the subjects:—

The Comparative Merits of the Different Dry-Plate Processes, Exemplified from the Studies of Several Amateur Members of the Society. By Mr. Norman Macbeth, A.R.S.A.

The Progressive Results of the Past Session. By John Nicol, Ph.D.

On Some Properties of Glass. By Mr. Wm. Gilmour.

Transparencies. By Mr. W. T. Bashford.

Remarks on Landscape Work, and its Relation to Art. By Mr. Payne Jennings.

The Collodio-Bromide Emulsion Process, with Practical Experiments. By Mr. Alexander Mathison.

A Résumé of the Gelatine Process. By the Rev. H. J. Palmer, M.A.

A Month Amongst American Photographers. By John Nicol, Ph.D.

The thanks of the Society are due to the following gentlemen:—To Messrs. Macbeth, Mathison, Murray, and Jennings, for exhibiting selections from their works; to the Rev. H. J. Palmer, M.A., of Birkenhead, for samples of his gelatine plates and transferred films, and also for his portable dark slides; to Mr. W. H. Davies, for exhibiting a *photogravure* plate, and likewise delivering the lecture at the second popular meeting; to Mr. W. T. Bashford, for transparencies; to Mr. M'Kean, for exhibiting his portable camera and tent; and to Mr. G. W. Wilson, of Aberdeen, for his presentation of an Archer's fluid lens.

As a special feature in the transactions of the past year your Council would refer to the handsome presentation print of a picture by Sir Noel Paton, who kindly permitted it to be reproduced in carbon by Messrs. Doig, McKechnie, and Davies, exclusively for the members of the Society.

In conclusion: it will be seen from the Treasurer's report that the financial position of the Society contrasts favourably with any past period of its history.

Mr. Alexander Mathison, Treasurer, then read his report, previously drawing attention to the fact that the funds of the Society were locked up in the City of Glasgow Bank, but that, in consequence of an arrangement come to by the other banks for the relief of depositors, one-half was rendered available, and the Royal Bank of Scotland had given credit to that amount. The following is a summary of the Treasurer's report, which had been certified as correct by the Auditor, Mr. Alexander Niven, C.A.:—

Dr. BALANCE SHEET. Cr.

Receipts.	£	s.	d.
To Balance in hands of Treasurer and Arrears Collected from last year	57	0	1
,, Subscriptions from Members on the List at the commencement of the year—308 at 5s.	77	10	0
,, Subscriptions from New Members—70 at 5s.	17	10	0
,, Subscription from One Life Member	3	3	0
,, Balance of Proceeds of Sale of Photographs	4	6	7
,, Interest on Bank Account..	1	13	4
	£161	3	0

Expenditure.				£	s.	d.
By Rent of Room				3	7	0
,, Presentation Prints				37	10	0
,, Expenses incurred at two Popular Meetings—						
Lecture Fee	£2	12	6			
Rent of Hall	6	0	0			
Oxygen and Loan of Bags	1	0	0			
Fitting up Screen	1	1	0			
Miscellaneous ..	1	0	2			
				11	13	8
,, Printing Billets				9	3	6
,, Postage of ditto, Stationery, Carriages, &c.				10	0	6
,, Fees for Secretary's Clerk, &c.				6	5	0
,, Arrears of Subscriptions written off				5	5	0
,, An Advertisement				0	6	0
,, Subscriptions in Arrears, 1876-7-8.				6	0	0
,, Balance due by Treasurer—Amount in Deposit Receipt with City of Glasgow Bank, including int...	£61	7	5			
On Account Current ditto	55	5	11			
	116	13	4			
Deduct one-half thereof, for which credit has, meantime, been obtained with the Royal Bank of Scotland	58	6	8			
	58	6	8			
Balance on Account Current with the Royal Bank of Scotland, per Pass Book	10	11	2			
In hands of the Treasurer	2	14	6			
				71	12	4
				£161	3	0

The above financial report having been adopted, the meeting proceeded to the election of office-bearers for the ensuing year, when the following gentlemen were unanimously chosen:—

President: John Lessels.—*Vice-Presidents:* Dr. J. A. Sidey and Lieut.-Col. Herne.—*Hon. Secretary:* Malcolm G. Dobbie, 320, Leith Walk, Edinburgh.—*Treasurer:* Alexander Mathison.—*Corresponding Secretary:* William T. Bashford, Portobello.—*Lecturer:* W. H. Davies.—*Auditor:* A. T. Niven, C.A.—*Councillors* (to supply the places of those retiring): William Forgan, Robert Murray, C.E., Duncan Anderson, Hugh H. Pillans, and James Dickson.

The only alteration of note was that of lecturer. It was agreed that this officer should henceforward have a seat at the Council board, and that no fee be attached to the office.

The usual vote of thanks having been passed, the meeting terminated.

Correspondence.

The Inaugural Meeting of the Session of the Photographic Society of France.

The opening meeting of the new session of the Photographic Society of France took place on Friday, the 8th instant, the chair being occupied by M. Peligot, member of the Institute of France. In consequence of the wet and unfavourable weather the *séance* was not so numerously attended as is usual on the Society reassembling after a vacation.

The proceedings commenced with the election of MM. Mieusement and Arembourg as new members. Captain Jolly, commandant of the new fort of Palaiseau, was presented for election by MM. Alfred Chardon and Davanne.

M. Pector, in the absence of M. Perrot de Chaumeux, the Secretary, read the extracts from the foreign journals, quoting largely from The British Journal of Photography and from the *Philadelphia Photographer*, in which Professor Stebbing gave Mr. A. L. Henderson's formula for the wet collodion process.

M. Davanne said he had received from the Mayor of Chalons a request for sympathy and aid from the Society towards erecting an international statue to Niepce. To carry out the object of the application, he proposed that an international commission should be named, consisting of the Duke de Chaulnes, Dr. Hornig, Balaguy, Berthaud, Civiale, Levy, Pector, Bardy, Harrison, and Robert de Sevres.

The proposition was warmly received and carried unanimously.

M. Adolphe Martin made a communication on the awards of the jury in class XII of the Paris Exhibition, and complimented the Photographic Society of France on the success of its members generally, and especially M. Peligot, who had been promoted to be commander of the Legion of Honour, and MM. Gauthier-Villars, Davanne, Dujardin, and Rousselon, who had each received the cross of chevalier, as well as M. Poitevin, who received an exceptional prize—probably some £500. The Societies of Paris and Vienna, and the state establishments of St. Petersburg and Lisbon, had each been accorded high honours, and he thought the awards had given general satisfaction. True, several exhibitors complained, but that always occurred in a great competition, when individuals form a different opinion of the value of their labours to that of an international jury composed of competent and honourable men whose decisions in a matter of judgment should be final.

Prof. Stebbing exhibited an untouched, rather feeble negative—a portrait of himself—made during his last visit to England, by means of the electric light, by Mr. Vanderweyde, with an exposure of thirty seconds. The light was not offensive to the eyes. The arrangements were of a very primitive nature, the carbon pencils being moved by the hands of the photographer during the operation, which was hastily done and without extra care, as may be seen from the fact of the head-rest appearing in sight.

M. Poitevin having found amongst his collection of enamels a bust portrait of the late M. Balard, formerly President of the Society, begged their acceptance of the same, which M. Davanne proposed should be framed and added to the archives of the Society.

M. Pistoja, on the military staff of Italy, sent for the inspection of the Society several photo-engravings made by a process which he could not divulge. They consisted of ordnance maps, pen-and-ink drawings, and engravings of great beauty and fineness of execution, rivalling anything yet exhibited before the Society.

MM. Insley and Pacheco, of Rio Janeiro, sent also a collection of the Californian promenade-sized *cartes*, showing good photography. The form and proportions of the pictures, for the first time exhibited at Paris, did not meet with approval.

M. Carlos Relvas made a present to the Society of a handsomely-bound portfolio containing a collection of his works, for which he had been rewarded with a gold medal by the jury of Class XII., and which consisted of specimens of silver, carbon, printing-ink, collotype, and photo-engraving proofs, all executed by himself, and which made the Portuguese exhibition so resplendent and interesting.

M. Henri Pellet forwarded the results of his improvements in the ferro-prussiate process, with specimens of four different papers called "cyanofer paper," the last of which was of a resinous character, and so highly glazed as to be sufficiently transparent to serve for tracing-paper as well as for the reception of the prussiate image.

M. Adolphe Martin recollected that Lacroix exposed in the Exhibition of the Champ de Mars, in 1867, laminated paper, and which was not only uniformly transparent, but tough at the same time.

To this M. Davanne added that the No. 4 paper of M. Pellet might be considered as an able application of that principle.

M. Ferrier, on behalf of M. Vivien, exhibited the *iconometre* of M. le Commandant Faure-Biguet, which, in outward appearance, resembles the small focussing-glass of Dallmeyer, and consists of a small brass tube with telescopic slide, containing a parallelogram-shaped diaphragm, the eyepiece sliding in and out, and showing the focal length of the lens required to produce the image shown within the diaphragm. It appeared a very elegant little instrument, and might form a companion during a photographic tour, and render assistance in the choice of points of view suitable for the size and form of the photographic lens.

M. Garcin forwarded a sealed box of plates prepared by the gelatino-bromide emulsion process, which, on the motion of M. Davanne, was referred to the commission on emulsions for trial.

Prof. Stebbing presented a number of proofs obtained with the salts of platinum by the new process of Mr. Willis, Jun., and gave an experimental demonstration of the process. He said that about three years ago Mr. Willis sold his patent in France to MM. Poulenc and Wittmann, but the French photographers refused to buy licenses to work the process, inasmuch as hyposulphite was used in the manipulations. To remedy this state of things Mr. Willis made experiments which resulted in an improved process in which no hyposulphite of soda was required. He also found that oxalate of iron would be very useful for developing dry plates, but it required a restrainer. Mr. Willis begged Professor Stebbing not to publish the fact, preferring to continue his experiments. Shortly afterwards Mr. M. Carey Lea published his process, containing what was wanted, namely, a restrainer—gallic acid; and although Mr. Willis and himself had some months before experimented in connection with the discovery, it was undoubtedly the property of Mr. Lea, he having made the first publication of the complete process.

The thanks of the Society were voted to Professor Stebbing for the communication he had made, for his demonstration, and for the copies of prints developed before the members and thereupon presented to them.

Asnières (Seine), Paris, November 11, 1878. W. Harrison.

THE BOISSONNAS' PROCESS.

To the Editors.

Gentlemen,—If you think the publication of the extra-rapid process of M. Boissonnas, about which so much has been said recently, will interest your readers I beg to send you the formula employed by him, by which photographers will be enabled to judge for themselves of the rapidity of the process.

The most important part consists in the addition of acetate of copper in the developer, which is composed as follows:—

Distilled water	1,000 parts.
Protosulphate of iron	60 ,,
Acetate of copper in solution of ten per cent.	20 ,,
Glacial acetic acid	50 ,,
Alcohol	50 ,,
Pure honey	12 ,,

The silver bath must be quite neutral. The collodion is as follows:—

Sulphuric ether	500 parts.
Alcohol	500 ,,
Pyroxyline	7 ,,
Iodide of ammonium	3 ,,
,, ,, cadmium	3 ,,
,, ,, zinc	1 part.
Bromide of ammonium	6 parts.

—I am, yours, &c., G. Morgan.

12, *Rue la Bruyére, Paris, November* 5, 1878.

Photographic Recollections.—"Whatsoever man has done, man can do." We don't know who may be the author of this old saying, but remember it as among the mottoes. It seems reasonable and consistent at first thought, but we have a case in mind where the problem wouldn't solve. It was a four-four negative, and the subject was a lady from the provinces, who was in such a hurry she could not give but one sitting, though we tried to secure a second; but, as she had to catch the train, we had only time to receive the pay and take express directions for sending. Owing to a rare combination of unexplainable causes, we had background effects which were more prominent than picturesque, and which we could hardly get rid of by ordinary masking manipulations. Our silver bath had all upon a sudden become bedevilled. We looked into our dirt barrel to see if our new sweed had not dumped its contents into the said bath, but that was intact. We examined our developer to see if it had not been recruited from the slop jar containing our waste, but we could not have the heart to lay the trouble there; it looked too blameless. The picture was to be a *plain* albumen print, which we were to frame and forward for value received. How to make a plain print from this negative was *positively* a sticker. It was so ornamental, so full of accessories, that we felt the value of it as a *specimen* was out of all proportion to the contract price, and yet we sent it with all extras thrown in. Much to our surprise we failed to receive some suitable expression of the lady's opinion of our artistic efforts. We had reason to fear she might write upon the subject, possibly by return mail; but she didn't. Some weeks after, however, we were waited upon by a family who hailed from the provincial town where our work of art had been sent. They brought a letter of introduction from our lady subject, saying that these persons were her friends and neighbours, and were so much pleased with her pictures that they wanted some *just exactly the same;* and in order that we might see the point, they brought the sensational picture with them. They then showed us an editorial paragraph from the village chronicle, in which its wonderfully unique effects were set forth, closing with the remark that *no other artist in the country* *could produce anything approaching it;* and, what was noted as equally astonishing, it cost no more *than ordinary* productions of its class! Though the paragraph was brief and very complimentary, it started a profuse perspiration as we perused it; for with all our ambition to keep up our reputation as a skilful artist, we were "cornered" to know how to reproduce the chemical chaos represented in this art specimen, "just exactly like which" five more were wanted from new subjects, who had come a long distance for the purpose. It may be thought reasonable that we should close this article by giving a formula for such reproductions under such circumstances; but formulæ, you know, are so liable to mislead.—*Anthony's Bulletin.*

EXCHANGE COLUMN.

Wanted, a quarter-plate lens in exchange for a 14 × 12 glass bath.—Address, John Beringer, Helston.

A very clean copy of Senefelder's *Instructions in Lithography*, with numerous illustrations, will be given in exchange for anything useful in photography.—Address, J. Webber, Wells, Somerset.

I want a rolling-press 20 × 16, and offer in exchange a press by Bury 18 × 12, a Newton lantern, and a quantity of slides or the choice of several lenses to balance.—Address, W. Ayres, Boundary Villas, Royal Crescent, Notting-hill, W.

A Dubroni apparatus (No. 2), in perfect working order, with portrait and landscape lenses—size of plate $2\frac{3}{5} \times 2\frac{3}{10}$ inches—in exchange for a tourist camera, by any good maker, for dry plates of about the same size.—Address, H. A. T., Port Ballintrae, Bushmills, Co. Antrim, Ireland.

ANSWERS TO CORRESPONDENTS.

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

A. C.—The effect is obtained by working on the negative with a finely-pointed pencil.

Rev. S. T. P.—Both lenses are good, but No. 2 will be slightly quicker than No. 1, if both be used without any diaphragm.

T. T. T.—"Biborate of soda" is merely common borax. It does not reflect credit upon your local dispensing chemist that he is unacquainted with this simple fact.

M. D.—Not having tried the lens we are unable to speak from experience; but depth of focus and width of aperture are two properties which cannot exist together, good definition being presupposed.

Geo. F. Reade.—Not only is there no copyright in the pamphlet, but we have reason to believe that if you were to reprint all or any of it and distribute it widely you would receive the thanks of the publishers.

X. Y. Z.—1. Gelatine is soluble in hot, but not in cold, water; hence you are wrong and your "better half" is right.—2. Chloride of ammonium will answer better than any other salt. Let the proportion be twenty grains to the ounce of water.

Tyro.—For positives on glass let the collodion be tolerably thin and not too heavily iodised. Also, let there be two drops of nitric acid added to each ounce of the developer in addition to the acetic acid in the formula. Fix with cyanide of potassium.

P. O. Strahan.—As there are some individuals who have no ear for music, and are unable to appreciate "sweet sounds," so there are others who are incapable of appreciating colours, and of such may be your client. Do not give way to her foolish whims, which to us seem quite unreasonable.

R. E.—Monckhoven's treatise on *Photographic Optics* is published by Hardwicke and Bogue, Piccadilly. The second part of that volume is devoted to the production of enlargements—or, speaking more correctly, to the apparatus for enlarging—having special reference to the construction of the solar camera.

Instantaneous (Haverstock Hill).—1. The lens is much too slow to permit pictures to be obtained in the manner intended, even when making use of the most sensitive plates.—2. The lens C is also quite unsuitable, but either of the others will answer. We have made use of all the three with excellent results. D is slightly quicker-acting than the others.

J. E. G. Ford.—Unless the nitrate of silver be washed out of the prints the toning-bath will most certainly be destroyed. Mr. A. J. Wilson, writing on this subject in his manual of *Silver Printing*, says:—"It is hardly necessary that the prints should be absolutely freed from silver before putting them in the toning-bath, but it will prevent some waste of gold if they are nearly so."

A. A. C. Swinton.—1. No manual of the collodio-chloride process has been published.—2. No.—3. We are not aware of any remedy for the blistering of Swan's plates, unless a preventive at one time suggested to us by Mr. J. Werge meets the want, and which consists in making use of warm solutions. —4. We have never experienced the mealiness alluded to in such samples of ready-sensitised paper as we have used.

J. R. S.—Unless you have a very bright light you must either give a much longer exposure than you have been giving, or otherwise make use of a portrait lens, by which you will be able to secure well-exposed positives in a few seconds. With the lens you are at present using you may have to increase the exposure to nearly a minute, but without possessing more complete *data* than you have furnished, from which to judge, we cannot speak with definiteness. The time required for the collodion setting depends entirely upon the relative proportions of ether and alcohol; but a pretty accurate idea may be arrived at by applying the finger to the film after it has been formed.

George Scott wishes to know if any reader has had experience in the coating of silver prints on albumenised paper with collodion with the intention of preserving them from fading. Several years ago this subject received much attention, and many strong statements were made respecting the value of such a mode of preserving prints; but, so far as we can recollect, the facts eventually turned out to be contrary to the assertions, and the process was discarded.

R. R. Abel.—We do not comprehend precisely what you mean by the "*principle* of vitrified photographs." From your letter we gather that you have not bestowed much study upon either the principles or practice of this branch of photographic art. Suppose that a collodion transparency were heated to redness in a furnace the picture would be found to have been burnt-in, the "blacks" being of a bright yellow colour. But, if previous to burning-in, the picture had been toned with platinum, iridium, gold, manganese, or other substances, the tone of the picture, instead of being of a canary colour, would be brown, black, violet, or other tint, depending upon the nature of the toning agent employed. Make a few practical trials and then write again.

Major Ross.—After reading carefully the account of your method of practising the glycerine process, we believe that we are enabled to indicate with accuracy the cause of your failure. The silver bath which you have been recently using—unlike that employed five years ago, when, you say, success crowned your every effort—contains a large proportion of nitric acid. For the special purpose for which the bath was prepared the presence of nitric acid was beneficial; but for the glycerine process it is hurtful, because glycerine is decomposed by nitric acid. The first thing to do, therefore, is to get rid of this acid, which may easily be effected by adding oxide or carbonate of silver to the bath until the whole of the nitric acid has been utilised, and then acidifying by means of glacial acetic acid. Should it be thought desirable to make a new sensitising bath let it be composed of—

Nitrate of silver	1 ounce.
Distilled water	12 ounces.
Acetate of soda	3 grains.
Glacial acetic acid	6 minims.

The preservative should consist of equal parts of glycerine, honey, distilled water, and the above bath solution, with a moderately-large proportion of kaolin—say about one-sixth of the quantity of the glycerine. Shake well, and place it in strong light for two or three days. It will become at first dark, but afterwards clear and bright. Decant, and use the clear portion.

The Royal Academy.—At a general meeting of Academicians, held on Wednesday evening last, Mr. Frederick Leighton, R.A., was elected President.

Indecent Photographs.—At the Middlesex Sessions, before Mr. Serjeant Cox, on Tuesday last, the 12th instant, Joseph Cave, 35, described as a photographer, pleaded guilty to selling and publishing several lewd and obscene prints and photographs. Mr. Besley, who appeared for the prosecutors, the Society for the Suppression of Vice, stated that the defendant kept a shop in Euston-road, and was reported as dealing in these pictures, in consequence of which an agent was employed to buy, and detection followed. The seizure was small, as it is the practice now not to keep a stock, but to get from travellers daily what customers previously order. Detective Kerley, who made the seizure, stated that the photographs were produced in England. Mr. Montagu Williams, for the prisoner, said he had made very few sales, and had not been long acquainted with the trade. Mr. Serjeant Cox sentenced the prisoner to nine months' imprisonment, with hard abour, and the photographs were ordered to be destroyed.

LONDON GAZETTE, *Tuesday, November* 12, 1878.

Petition for Liquidation by Arrangement.

Alfred Wilkinson, Sunderland, optician, photographer, and stationer.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For the Week ending November 13, 1878.

These Observations are Taken at 8.30 a.m.

Nov.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
7	29·69	—	47	35	38	40	N	Overcast
8	29·49	—	46	35	42	45	WSW	Raining
9	30·13	—	50	33	34	37	N	Hazy
11	29·48	—	45	38	40	42	NW	Overcast
12	29·43	—	41	32	33	35	W	Hazy
13	29·41	—	39	32	35	38	NE	Overcast

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 968. Vol. XXV.—NOVEMBER 22, 1878.

ON THE EFFECTS PRODUCED BY REDUCING THE QUANTITY OF PYROXYLINE IN EMULSIONS.

Continued experiments with the modified emulsion we briefly described last week lead to a strong confirmation of the remarks we then made in its favour. Not only are the physical qualities of the film much improved, but a great increase of sensitiveness is obtained without, as is usual under such conditions, a corresponding loss in density. We are inclined to believe, however, that the degree of density obtained is less in proportion to the quantity of bromide contained in the film than when an emulsion containing a larger quantity of pyroxyline is used. It is necessarily difficult to arrive at an accurate judgment of the comparative quantities of bromide forming the respective films, which bear much the same relationship to one another as ordinary carbon tissue and special transparency tissue—the one being a thin film rich in bromide; the other having greater body but less bromide.

As we have said, there is no loss in actual density in the new emulsion; but, if two images of similar intensity be each treated with chloride of copper until thoroughly bleached, there will be found a surprising difference in their appearance by transmitted light, the new emulsion showing far greater density, and the difference is again increased when the chlorised images are reduced by means of alkaline pyro. Thus it would seem that, atom for atom, the bromide contained in the thinner film produces less density under the first development than that formed in the presence of a larger quantity of pyroxyline; but the fact that the atoms are packed closer together makes up for any deficiency which might otherwise arise.

Another remarkable feature in the thinner films is their increased permeability. We mentioned last week the tendency which they exhibit to abnormal or total reduction under the action of a slightly stronger developing solution than is ordinarily employed. Our experimental readers will know that an ordinary collodion film, whether prepared with the bath or from an emulsion, and entirely freed from nitrate of silver, may be kept in contact with a tolerably strong solution of alkaline pyro. for a very long time without suffering any appreciable reduction, provided always that it be carefully preserved from the slightest actinic influence. Pure silver bromide precipitated from aqueous solutions is, however, instantly reduced by the weakest developer, even though the precipitation may have been performed in the presence of excess of soluble bromide; indeed, the presence of a very large dose of the latter in the reducing solution scarcely causes any retarding action. Clearly, the difference is due to the presence of the pyroxyline; but whether the action of the latter is mechanical or chemical is not so easy to decide. If it be chemical it must arise, one would think, from some combination formed with the other constituents of the emulsion during sensitising; but that it is not wholly due to this is proved by the fact that silver bromide formed separately and afterwards incorporated with collodion is capable of producing a developable image. On the other hand, if we suppose that the retarding action of the pyroxyline is wholly due to mechanical causes—that is, to the fact of the particles of bromide being locked up in and protected by the collodion—how are we to account for the discriminating action of the developer in reducing only the exposed portions, the whole of the film being uniformly permeable? As neither of these views seems to be tenable, we must fall back upon the supposition that the action of light overcomes in some way the protective power of the collodion.

Whatever may be the truth, it has come to be accepted that coarse films—that is, films in which the particles of bromide are formed in a state of greater coarseness—are more sensitive and give less density than when opposite conditions prevail, and this result is attributed to the fact of the individual particles being less exposed to the retarding influence of the pyroxyline than when a more intimate mixture, arising from a finer division of the atoms, exists. Looking at the matter in this light it would be reasonable to expect that, if the influence of the pyroxyline be reduced by diminishing its quantity as compared with the bromide, a like result would ensue; and certainly our experiments would seem to bear out the expectation, the grain of the film being at the same time finer and its texture more homogeneous than if some other means had been resorted to to produce the change in character.

The colour of the emulsion, as well as of the film, produced with a minimum quantity of cotton is identical with that obtained under ordinary circumstances, but the shade may vary slightly from difference of thickness. Thus we have invariably met with orange or ruby tints, and never, so far, with the grey or violet shades, which are usually supposed to mark coarseness of deposit. By reflected light the appearance of the new film, however, is totally different. Whereas with a full quantity of pyroxyline the film presents a smooth, brilliant, and slightly-reflecting surface, under the opposite conditions it offers a fine matt or dead appearance—not, however, amounting to what has been described as "dusty."

If we extend the examination to the developed image the difference is, if possible, still greater. Let us hold an ordinary negative (in its dry, unvarnished state) in such a position that the light falls upon it at an acute angle, and we find that the surface presents to the eye an even, polished appearance. The image, however, is distinguishable, owing to the difference in the colour of the light reflected from the different portions, this being of a "coppery" or orange shade where the deposit exists, and white in the transparent shadows. We now submit to the same treatment a negative produced by means of the "reduced" emulsion. While the shadows present the same appearance, the lights show a dead, velvety surface, wholly devoid of reflecting power, and giving the impression of having been "dusted on" with lampblack. So striking is this that a positive exposed in this manner to the even light of a clear sky gives the effect of a brilliant picture on polished silver.

As regards the tenacity of the film and its capacity for resisting damage during development and washing, there does not seem to be any deficiency—in some respects the opposite. It never shows the slightest tendency to slip even under trying circumstances, and if, under the action of a violent stream of water, it should be damaged, the injury is totally different from that produced under like conditions upon a strong film. Instead of tearing away in large pieces the damage is merely local, the film having so little tenacity or continuity that the injury does not spread beyond the area immediately affected, and then the image seems to wash away in the state of powder rather than in a continuous "skin." When dry, the deposit is easily rubbed off as powder, very slight pressure with the finger sufficing to lay the glass quite bare and clean, whereas with a film of ordinary strength the same treatment would only communicate a higher polish to the surface without producing a scratch. The difference is not such as to render the film practically more tender than an ordinary one, for it is really better fitted to meet the dangers arising from the various washings; and, we imagine, few of our readers (except they be collodio-albumen workers) are in the habit of submitting their negatives to friction before varnishing.

Another important point to be considered in connection with the subject is the capability of the thin emulsion to resist washing or precipitation. We have not yet tried the first; but have gone through the operation of *precipitating* several samples with complete success, and, we must confess, with some surprise at the non-realisation of our expectations, for we had quite anticipated that we should break down at this test. If the emulsion be first mixed with a small quantity (half its own bulk) of water and thoroughly stirred or shaken, and fresh water then added till three or four times its volume has been used, the solid portions settle down at once in fine powder without any appearance of "strings" or "clots," and with no tendency to remain in suspension or float upon the surface, as is often the case. In this state it is easily and rapidly washed and dried, and, when redissolved, forms an emulsion scarcely differing from the unwashed one. In one instance in which the precipitation was done hurriedly a slight granularity was noticeable in the resulting final emulsion, but this was entirely removed by filtration. It is remarkable, as bearing upon what we have said above regarding coarseness, that the granular particles, upon development, became black specks, even in the non-exposed portions, thus showing their stronger tendency to reduction.

Since writing our previous article we have been reminded that Mr. B. J. Sayce, so long back as 1864, recommended the reduction of the proportion of the pyroxyline to two grains to the ounce. This was, no doubt, done in order to improve the fluent properties of the emulsion; but, in the then knowledge of emulsion requirements, it was not found to answer, as we find in subsequent formulæ Mr. Sayce went back to the old proportions. Now, however, we have confidence in again bringing to the surface Mr. Sayce's long-forgotten modification, and, in the present condition of our knowledge, we believe that it will be found a very decided improvement, though it may not, perhaps, under all circumstances be advisable to carry the principle to the length we have indicated.

THE ELECTRIC LIGHT AND PHOTOGRAPHY.

Since writing the article on the above subject, which appeared in our issue for November 8th, we have become still more convinced that the electric light is destined to play no unimportant part in the future of photography, and that at no distant period; for we have recently heard of more than one large London establishment that is about to adopt it—not as a substitute for ordinary daylight, although that has already been done at one studio—but as a power to be used when that light is too feeble to produce a good negative; and we think they will do wisely, too. Here is a case in point:—We called on a photographic friend a few days back, and found him bitterly bewailing his fate. He had, it is true, by the aid of quick-acting lenses and extra-sensitive chemicals, managed to secure a dozen or so negatives of more or less merit; but he had also been compelled to turn away nearly three times that number of intending sitters for want of sufficient light to secure such negatives as even with the assistance of skilful retouching would pass muster and be a credit to his establishment.

It is always a serious matter for the photographer who may be, and generally is, subject to heavy expenses to have to refuse sittings, as although many sitters might, no doubt, return, all cannot be expected to do so, as they may be only visitors to the metropolis, or, perhaps, may be leaving England, or subject to the thousand-and-one things that occur in daily life to prevent a large proportion of them ever again visiting the studio. Further: the disappointment of the would-be sitter is not less than that of the photographer, as the former may have frequently put themselves to great inconvenience in dressing expressly for the occasion, or have travelled long distances on purpose to be photographed by their favourite artist; and their disappointment is very great when they are informed that the light is not sufficiently good for the desired purpose. Now, if the electric light were at command—and we know that good portraits can be produced by its aid—all would be satisfied; the photographer would secure his guineas and the sitters their portraits.

It may be argued that the outlay for the necessary apparatus would prove a very serious matter, and so, no doubt, it would be, especially in the case of a small business; but we feel convinced that those who may spend a couple of hundred pounds or so in a Gramme or Siemans' electro-dynamic machine and a gas engine will find it in the end a good commercial speculation, as they will then be able to secure negatives of all sitters visiting the studio regardless of the weather. We also feel assured that many would be induced to go on dull days by preference, owing to the novelty of being taken by the light which is just now creating such excitement in all circles as well as on the Stock Exchange; and by this means a large accession of business might fairly be expected by those who adopt the electric light for photographic portraiture.

At the last meeting of the Photographic Society of Great Britain the result of a new application of the electric light to photography was shown in the shape of a carbon enlargement made by enlarging from the small negative direct on to the tissue, the time of exposure being, we are told, fifteen minutes. And we may here remark that some of the best enlargements we have seen have been produced by enlarging direct from the original negative by the aid of the solar camera. This means of enlarging is very generally employed on the continent and also in America; and from suitable negatives there is little doubt that it is the best and most economical way of working, especially when only one or two enlargements from the same negative may be required, as it saves the trouble and expense of making transparencies and enlarged negatives, which entails also a certain amount of loss of sharpness and detail existing in the original negative. But, unfortunately, the solar camera is practically useless for the greater part of the year in this country, owing to our variable climate, and the uncertainty as to when "old Sol" will next show his face after every preparation has been thus made for his reception. This is amply proved by the weekly returns of registered sunshine, which show that our great luminary *now* shines something less than twenty hours per week. It is well known that the sun's actinic power is at present at its minimum; so that if any means can be devised for producing the same effects by artificial light as are obtained by the use of the solar camera it will be a boon to photographers.

Now the electric light seems to fulfil these conditions, as the result shown at the meeting to which we have referred fully proves. If it can be worked on a commercial scale—and we can see no reason why it should not—it will have many advantages over the present system of producing carbon enlargements, as no transparency or enlarged negative will be required, thus effecting a great saving of time and, consequently, expense; for the time required to produce the enlargement direct will be less than is necessary for the production of a print from the enlarged negative when it is made.

As regards the question of cost of this method of working: there will be a great advantage in favour of the electric light; that is, if the published estimates of the necessary expenditure be correct, which, for a light of suitable power for this purpose, is from fivepence to eightpence per hour. But when we consider that the rays of the electric light, unlike those of the lime light, are equally luminous in every direction, it will be seen that if it be placed in a square lantern, condensers may be fitted on each of its sides, and that if this lantern be placed in the centre of a room four negatives can be exposed simultaneously on tissue placed in each corner of the room with one expenditure as regards light, thus reducing its cost to a mere bagatelle.

We had no opportunity of examining the negative from which the enlargement shown the other evening was made, nor are we aware whether the tissue used was extra-sensitive or that it was kept for any length of time after exposure and before development, so as to take advantage of the so-called "continuating" action of light. We think, however, that sufficient was shown to warrant us in directing the attention of our professional readers to this means of supplementing the present limited supply of sunshine, and carrying on their ordinary operations with profit to themselves during the winter months.

A PHASE OF ENLARGING.

Taking a hundred average enlargements, an experienced photographer would be able at a glance to see that they were not pictures and to point out the mode of working that had been adopted in ninety-nine of them, and of those ninety-nine we are afraid there would be but a small proportion which could be classed as excellent. But yet there would appear to be no reason why, if properly treated, an enlarged photograph should be in any way different from a plain one, except in so far as the *texture* of the film is concerned; and there are many modes of enlarging in which this quality may be quite put on one side, owing to the ease with which it is perfectly avoided.

Any photographer who has taken the pains to perfect himself in copying pictures knows the ease with which a negative can be obtained—say of whole-plate size—from a *carte de visite* which is perfect in every respect, save only that the grain of the paper also is enlarged so as to give a disagreeable granularity or unevenness of texture in the resulting print. There is no way of avoiding this fault, though it may, to a considerable extent, be palliated by various means.

The process of enlarging direct on to silvered paper and bringing out the image by development is capable of almost perfect results; but the scope of this mode is very limited, as it is practically out of the field for small work, and, being most under control for plain paper only, there is sometimes a difficulty in obtaining sufficient depth and richness in the shadows, while the producing of large numbers of a given negative would occupy such time as to make the price prohibitive in comparison with other and more rapid means.

The process of enlarging through the medium of a transparency, and obtaining from it a negative of the required size, is, without doubt, the theoretically perfect one, and it is now practised, we believe, by most photographers who make a *specialté* of that branch. It is, however, in the hands of most workers, liable to two capital defects, viz., a tendency to a line of halation round the boundaries between dark and light spaces, and, most common fault of all, a peculiar flatness and want of vigour in combination with due variety of shadows and tones.

This latter fault, which only we wish to consider at present, though not always seen in everyone's work, is practically the grand stumbling-block, and we are inclined to believe that a true conception of its causes has not hitherto been formed, or, at anyrate, its governing principles formulated. Actuated by a determination to arrive, if possible, at a true solution of the problem we have lately produced many enlarged negatives, and made a special study of such transparencies as we had the opportunity of examining, as well as their resulting negatives.

We believe we have thoroughly established an explanation of the cause of this deficiency of modelling, vigour, and transparency of the deep tones. At first sight there seemed to be no kind of classification which could be adopted that would be capable of including all the transparencies we examined, for to these we naturally looked for the true solution. We had silver transparencies, beautifully rich, of all shades of colour, toned and untoned, and of all intensities—from those where the shadows seemed formed of velvet to the lightest and most gauzy-looking films—and each of these had produced an almost perfect negative difficult to be detected as not direct from life. (We confined our examination to portraits, as we considered the greatest nicety was there needed to produce a perfect result.) Then we turned to negatives obtained from carbon tissue, and among these was a still greater proportion of perfect results, the transparencies being obtained likewise from tissue of all colours, varying from the richness and depth given by the "transparency tissue" to the faint image from a thin portrait tissue. From each variety had been obtained excellent results.

Clearly, then, it was not to the transparency that we had to look to discover the secret of success, and, as the result showed to be correct, we surmised it all depended upon the strength of the light sent through the transparency whether the negative obtained was good or bad, the strength of the transparency determining the intensity of the light. It has been constantly argued that when examined in an average light, if complete gradation existed there to start with, an extra intensity of light would merely require a diminished exposure to obtain identical results; but this argument is fallacious, as we will show. Taking a transparency of average density, let us assume a weak light sent through it enables a perfect negative to be taken; then, if we send a light (say) ten times as strong through it, the scale of proportion existing between the high lights and the deep shadows is entirely different. For in the first case there was an entire gamut of tints, and in the second only a portion of it, for there would be able to exist a further series of deep tints below the deepest of the shadows; in other words, with the stronger light the relative intensity of the lights and the shadows in the transparency become considerably reduced, and the scale of tints in consequence incomplete.

The argument from these principles is obvious, and needs not to be dwelt upon at length. All that is necessary is either to make a transparency of rigorously-exact uniformity to suit the special light employed, or, if that be impossible, to have the light so under control that screens of various degrees of translucency could be placed before it so as to diminish and modify its power to any extent. With the light we have thus thrown upon the subject we believe we have indicated a decided advance in the power of producing good enlargements or reproductions of negatives.

RECENT PATENTS.

No. XXI.—ALDER AND CLARKE'S LUXOGRAPH.

The patentees must not be held responsible for the above heading, which we have adopted from the trade title of the instrument by which were taken several excellent portraits that formed part of the pictorial display at the Photographic Exhibition just closed, and of which pictures we have been permitted a more detailed examination at leisure. The title of the invention patented is "Improvements in Means and Appliances for Producing Powerful Artificial Lights for Photographic and other Purposes;" but the instrument or apparatus described is, we understand, that which is now commercially known as the "luxograph"—a designation to the correctness of which hypercritical etymologists might demur. The patentees say:—

Our invention has for its object the production of photographs without the aid of daylight, and at times and in places where it would ordinarily be impossible to produce them.

We use any of the well-known actinic artificial lights, such as the electric, magnesium, or pyrotechnic compounds, by preference the pyrotechnic, on account of its not requiring expensive apparatus and machinery. It is well known, however, that unaided artificial light is useless for the production of satisfactory pictures, as rays of light coming from a point are quite unsuitable for the purpose. Our invention enables the operator to produce pictures equal to those taken by ordinary daylight. For this purpose we employ a reflector of suitable size, by preference one about four or five feet in diameter, in conjunction with the said light, and with the reflecting surfaces placed at suitable angles; we prefer to render the rays of light parallel or convergent to a focus. In conjunction with the reflector or otherwise we employ one or more semi-transparent screens placed between the source of light and the object to be photographed, by which means the rays of light are dispersed or diffused equally, and a soft and suitable light obtained for photographic purposes.

The improvements are to be performed by making the reflectors of silvered glass or other reflecting surfaces built up of small pieces, or otherwise formed, and fixed in a curved or other convenient shaped metal or otherwise constructed frame. In front of the reflector and in its centre of focus is placed the light, and in front of the light is placed one or more screens of opal or ground glass, or of *papier* *mineral*, tinted or otherwise, or other semi-transparent media of sufficient size to prevent the passage of any rays of light save through its medium, and thus all rays are dispersed.

In practice we often find it desirable to subdue the principal light by placing a violet or blue-tinted glass in front of it.

When either a pyrotechnic composition or magnesium is employed to produce the light a lantern of glass must be used with a chimney to carry off the fumes arising from the burning of the light, and the light supplied with air by suitable inlet.

Having thus declared the nature of our said invention, and the manner in which it is performed, we claim—1. One or more screens in conjunction with artificial light for diffusing the rays of said light. 2. One or more suitable reflectors for multiplying rays of artificial light and reflecting them at proper angles, in combination with one or more semi-transparent media for diffusing said rays, all for the purpose of illuminating objects for photographic pnrposes, all substantially as described and set forth.

Without making any observation upon the points of the specification, we may state that the portraits which have been taken by means of the luxograph are undoubtedly successful. We have seen the apparatus in operation, and have been present when a portrait was taken by its agency. The light, while undoubtedly powerful, was so soft and delicate as to be quite inadequate to disturbing the equanimity of the sitter. It caused the little room in which the experiment was conducted to be illuminated with a mass of pale violet actinic light, by contrast with which the gaslight in the room became of a sickly-yellow colour. The negative we saw taken was very successful, the exposure being reasonably short. This negative and a print from it are now in our editorial office, where they may be seen.

During the past week we have made an experiment bearing upon Mr. H. B. Berkeley's recent remarks with regard to the behaviour of citrate of silver or citric acid in washed films and emulsions. The first and most important part of the experiment consisted in the preparation of an emulsion of citrate of silver alone. For this purpose seven grains of citric acid were dissolved in three drachms of alcohol; four grains of pyroxyline and half-an-ounce of ether were then added, forming a collodion (to use a Hibernicism) "bromised" with citric acid. This was sensitised by the very gradual addition of seventeen grains of nitrate of silver, first dissolved in a few drops of water and afterwards mixed with one drachm of hot alcohol. The silver was added a few drops at a time with vigorous agitation after each addition, in order to avoid, as far as possible, the crystallisation of the salt in the collodion; and the result was a fine, smooth emulsion which, in the yellow light of the operating room, was only distinguishable from an ordinary one in that the colour by transmitted light was no deeper than a medium orange. Poured upon glass it formed a film of a bluish-white, opalescent appearance and extremely translucent; but when partially dry the opalescence entirely disappeared, and when quite dry the surface was covered with a crop of very fine, frost-like crystals. The slightest contact with water, either while in the opalescent or subsequent stages, immediately discharged every appearance of either opalescence or crystallisation, which did not return upon re-drying. This was scarcely the result we had expected, and so far agrees with Mr. Berkeley's view as to render it extremely improbable that any trace of citrate of silver remains in a film or an emulsion after washing. It entirely negatives his supposition, however, that the removal of the citrate by washing would cause the film to be riddled with pinholes. If present in sufficient quantity along with silver bromide to crystallise out in the manner we have described, upon drying and subsequent washing efflorescent crystalline markings would, no doubt, result; but in washing previous to drying, the citrate, being evenly diffused throughout the film, would be removed in such extremely minute particles as to leave not the slightest visible trace behind. It remains to be said that, upon the addition of twelve grains of double bromide of cadmium and ammonium, a fine, rich emulsion of the ordinary description was formed, which only differed in general characteristics from one prepared from a similar formula (*minus* the citric acid) in giving a thinner and more powdery film, and in working with great freedom from fog—both owing, no doubt, in this case, as Mr. Berkeley suggests, to the large quantity of nitric acid liberated.

A FEW MORE REMARKS ON THE SUBJECT OF NITRO-GLUCOSE.

Rip van Winkle is up again in the shape of nitro-glucose, which after sleeping quietly—not for twenty years certainly, but sufficiently long to have been almost forgotten—now makes its appearance once more amongst us claiming recognition. Not that I object to the re-appearance—far from it. I agree with all M. de Pitteurs states in its favour, and believe that the chief, if not only, reason why it has failed in finding its way into use is the difficulty experienced in its preparation. This difficulty is not an absolutely necessary one, but I have not made any of the substance for the last four years, simply on account of the impossibility of obtaining acids of the requisite strength in Liverpool. To this may be added that the same necessity does not now exist for its use as prevailed when washed emulsion was as new here as it is now in Belgium. Other and readier means of obtaining density are now common; hence the trouble of preparing or obtaining nitro-glucose may be dispensed with.

I think, however, that M. de Pitteurs errs slightly in taking it for granted that density is dependent upon the formation of nitro-glucose simultaneously with the pyroxyline. As a rule *old* pyroxyline gives a denser image than it did when freshly prepared, and it is an undoubted fact that such is the case with a collodion which has been allowed to "age." Now, if we suppose that a sample of freshly-prepared cotton contains a minimum quantity (or none at all) of nitro-glucose, it is difficult to imagine by what reaction that substance can be developed as the pyroxyline acquires age, and the same remark applies equally to the case of collodion; therefore, in the presence of an actual gain in density under those circumstances, it must be evident that some other agency is at work.

Again: M. de Pitteurs supposes that the extra power of giving density, which high-temperature cotton is usually held to possess, is attributable to the presence of a larger proportion of nitro-glucose than exists in samples prepared at a lower temperature; but in making this special claim in favour of nitro-glucose in connection with *high*-temperature cotton he is quite at variance with the conditions necessary in the preparation of the substance, which are concentration of the acids and *low* temperature. If either of these conditions be neglected the result is that the sugar is carbonised, and though it may be urged that a portion of it may be at the same time converted into nitro-glucose, I have several times tried to detect the latter substance in the bulky black residue of an unsuccessful operation without the slightest success.

Furthermore: though sugar may exist in small quantities in raw cotton, the latter may be submitted to such treatment as to completely remove all traces of sugar or other matters without destroying the density of the resulting pyroxyline. Cellulose, too, may be converted by the action of sulphuric acid—first into dextrine, and then into glucose, but the change is only produced under circumstances widely different from those which accompany the formation of pyroxyline; and then we have to consider that nitro-glucose, so called, is formed from *saccharose*, not glucose—two substances similar in character, but differing widely in many of their reactions. For these various reasons I think that the existence of nitro-glucose in pyroxyline is, to say the least, extremely doubtful.

That the change which takes place in collodion in the process of "ageing" is one of decomposition there cannot be a doubt, and it is possible that a substance resembling but not identical with nitro-glucose may be formed in the process, but what the full extent of the reaction may be cannot be said. It is certain, however, that in the case of some descriptions of pyroxyline—especially if kept in a stoppered bottle or otherwise cut off from free access to the atmosphere—that nitrous acid fumes are formed. With nitro-glucose this change is far more rapid as well as more marked, and I have known a bottle containing a sample of that substance to be filled with brown vapour after remaining only two or three weeks without the stopper removed. It is worthy of notice that nitr*ite* of silver has long been known to conduce to density, and various nitrites have been recommended as additions to the bath or to the emulsion in order to produce a similar effect. Is it not possible that the beneficial effect of nitro-glucose may be solely due to the formation of nitr*ite* when brought into contact with nitr*ate* of silver? and that the difference brought about by the "ageing" of collodion is due to the same cause, the change being produced more gradually?

This brings me to another point. Since reading M. de Pitteurs' paper and the editorial comments thereon, I have obtained from a friend the remains of a quantity of nitro-glucose in solution prepared by myself and given to him more than four years ago. This I have tried in various ways in emulsion, both in the presence of free silver and the reverse, and the result has been somewhat remarkable. Instead of giving increased density the tendency is in the opposite direction, accompanied by the production of greater sensitiveness. Such, at least, would seem to be the case, as, with a given exposure, a larger amount of detail and an altogether flatter picture results from the nitro-glucose emulsion, together with a peculiar appearance as of incipient reduction over the whole surface of the film.

I could not at first understand these results, but after considering the facts it now seems to me, though I may be wrong, that I can explain the matter in accordance with the theory of decomposition before suggested. The nitro-glucose solution employed is labelled "thirty-five grains to the drachm," the solvent being a mixture of equal parts of ether and alcohol, which dissolves a far larger quantity than either ether or alcohol separately. When it came into my possession it was perfectly clear and showed no sediment, and possessed a powerful odour of *sweet nitre* (which is an impure solution of nitrous ether), the smell of sulphuric ether having either disappeared or become lost in the more powerful one. It is not difficult to believe that the nitrous acid given off in the decomposition of the nitro-glucose would gradually act upon the alcohol in the solution, forming nitrous ether (and possibly other compounds); but to test the accuracy of the supposition I made the experiment of adding sweet nitre to an emulsion before sensitising, and obtained a result so nearly identical with that secured with the nitro-glucose as to leave very little doubt in my mind.

The same solution of nitro-glucose when only a few months' old would have given a considerable increase of density, and I can only suppose that during the four years it has been kept the liberated nitrous acid has been re-absorbed by the alcohol, and thus entered into a combination from which it is not displaceable by silver nitrate to form silver *nitrite*, and thus the gain in density is lost.

I may mention that a portion of the solution precipitated in cold water formed a white pasty mass which, after several hours, refused to harden; the water in which it was contained was raised to the boiling point, when the nitro-glucose rapidly dissolved, forming a perfectly clear solution. The flask was then plunged into cold water, and, when cool, the nitro-glucose was found to have divided into two portions—one of which formed a transparent skin upon the surface (resembling in appearance a tough collodion film), the other remained in suspension, rendering the water perfectly milky and opaque. The transparent skin, when kneaded between the fingers, was reduced to a gritty mass without any of the peculiar silky cohesiveness of freshly-prepared nitro-glucose, and separated into granular particles upon rubbing. To the other portion remaining in suspension a few drops of a sixty-grain solution of silver were added, and the mixture exposed to light for several hours without undergoing the slightest change of colour. Leaving out of the question the doubt which exists as to the constant composition of nitro-glucose when freshly prepared, I think this proves that long keeping changes its character most entirely.

W. B. Bolton.

PRACTICAL INSTRUCTIONS IN MODERN PHOTO-MECHANICAL PRINTING METHODS.

Part I.—PHOTOLITHOGRAPHY.

VI. Printing from the Stone.—The inking-roller, having been freed from tallow as directed, is ready to be charged with the ink which is to be employed in the actual printing of the copies. The colour of this ink will, naturally, be varied according to the nature of the subject; and, as an example of the kind of consideration required in selecting the right tint, it may be mentioned that a deep jet-black will generally be suitable for the reproduction of an engraving, while an ink having a decided tinge of blue will, more correctly, imitate a pen-and-ink subject.

The right consistency of the ink and the amount of pigment required to be present in it, are only to be determined by experience and a careful observation of the effects caused by variations in respect to these qualities. The relative proportion of pigment and fatty matter in the ink is adjusted by mixing the commercial ink with more or less lithographic varnish, and the consistency of the mixture depends on the viscosity of the varnish employed. In order to enable the operator to make these adjustments at his discretion it is usual for lithographic inks to be sent from the manufacturer in a tolerably stiff state and highly charged with pigment. For a first experiment equal parts of the ink and of middle varnish may be tried, and after the working of this mixture has been well studied any required alteration may be made. The ink and varnish should be mixed together on the inking slab by means of a palette knife, and when the materials are well incorporated a tolerably even layer is spread over the slab by dabbing with the knife, after which any superfluity may be stored up at one corner of the slab for future use. The roller is then worked about on the slab until the film of ink is uniform and the grain of the leather is sufficiently charged with the ink.

This having been done, the stone is placed on the bed of the press, a few sheets of paper or of thin cardboard are laid on its surface to form a backing, and the pressure is adjusted. The gum on the surface of the stone is next softened and removed by gentle friction with a damp sponge; and the excess of moisture having been removed the inking roller is applied, a gentle pressure and rather slow motion being first employed. If, under these circumstances, the design should take the ink with extreme readiness, it is probable that the ink is too thin or that the motion of the roller is not sufficiently rapid. If, on the other hand, the design is found to take the ink with difficulty a slower motion of the roller may be required, or a thinner ink may be necessary. When the stone is over-moist, and an undue pressure is exercised on the inking-roller, it often happens that the roller slips over the stone without revolving on its own axis. Under these circumstances there is great danger of entirely removing parts of the design, and some of the above-mentioned conditions must be so altered as to prevent this gliding action of the roller. Not only in inking the stone, but also in working the roller on the inking slab, care must be taken to lift the roller after each movement to and fro, as, if this were not done, mischief might arise from the seam of the roller constantly coming in the same place.

One of the most difficult points in connection with the use of the inking-roller consists in applying an equal pressure during the whole of each stroke, the tendency of most persons being to press more heavily when the roller is near to the body than when it is far off, and also to exert more pressure with the right hand than with the left hand. The consequence of this is that that part of the stone nearest to the operator and towards his right hand receives more ink than its just share. In placing the stone on the press the above circumstance should be borne in mind, and those parts of the subject which have least tendency to take the ink should, when practicable, be placed in the most favourable position for receiving a good supply. After the stone has been inked a few rapid strokes of the roller are generally required, in order to clear the stone and to remove any excess of ink from the broader lines of the subject.

We are now ready for our paper, and when ordinary printing paper is to be employed it must be in a slightly moist condition; and it is best to moisten a quantity the day before it is required for use. The damping of the paper is performed as follows:—The paper having been cut to size, a bundle of ten or a dozen sheets is rapidly drawn through clean water, and is then placed on a smooth board, after which a bundle consisting of about the same number of dry sheets is placed on the wet bundle. Alternate bundles of wet and dry paper are thus piled up until sufficient paper has been treated, after which a board is placed on the top and gentle pressure applied by means of weights, the whole being now allowed to remain at rest until the moisture has equally diffused itself. In the case of enamelled paper it is generally best to moisten each sheet separately by gently sponging the back just before printing on it; but some samples of enamelled and hot-pressed paper will not bear being moistened, and have, consequently, to be printed dry.

A sheet of the damped paper is now laid on the inked stone in such a way as to avoid friction, the most convenient way of doing this being to lay one edge of the paper against a pencil line, which must be made on the stone; and after having clamped this edge by a slight pressure of the fingers, the sheet is steadily lowered into its position. The backing sheets being now placed over all, the tympan is shut down and the carriage passed through the press. Care must be taken not to tear the printed sheet in removing it from the stone, and when the adhesion is considerable the best way is to fold one edge of the paper quite back, and then to draw it off just as one pulls off the skin of a rabbit.

The first proof must be carefully examined in order to ascertain if the pressure has been uniform, a deficient pressure on any part being indicated by a want of ink on the corresponding part of the proof, notwithstanding the fact of the stone being well inked. Next examine the proof in order to ascertain if any of the fine lines of the original are wanting, any deficiencies in the coarser lines having already been made good as previously directed. In case any retouching should be required proceed as follows, but if it be considered necessary to remove the stone from the press it is as well to mark its position on the carriage, so as not to lose any part of the labour of backing-up and adjusting:—Gum the face of the stone with thin mucilage, and then wipe this off, so as to leave the surface of the stone covered with a thin and an almost imperceptible film of gum. When this is quite dry proceed to make good the defective lines by tracing them through the gum by means of a needle point mounted in a suitable handle. This operation will be found extremely easy if the layer of gum be thin enough; but when the layer of gum is so thick as to resemble a coating of varnish it will be found difficult to trace through it. The lines traced with the needle should be cleanly cut into the stone, and when they are satisfactorily traced a little dust is thrown out on each side of the trench cut by the needle point. By providing oneself with a collection of needles having points worked up to various degrees of obtuseness lines of any required width may be easily traced; and the operator will find it easy to produce lines so fine as to rival those made by any other engraving process. Any false lines may be easily rendered of non-effect by covering them over with thin gum water, and when the part is dry it may be worked on again. When all necessary lines have been traced the retouched parts are moistened with oil of turpentine to which a little printing ink has been added, and, after the excess of this has been wiped off by means of a soft and dry rag, the stone must be well rolled with the ordinary inking-roller until an even and not too thick film of ink is deposited over the whole face of the stone. The stone is then moistened so as to soften the layer of gum which lies underneath the ink, and a gentle sponging will now remove the excess of ink and leave the design clear and ready for printing.

The above method of engraving on the stone is extremely well adapted for use when it is required to add fine work to the subject in the shape of titles, signatures, or skies, as it is impossible to produce very fine lines by the use of the ordinary lithographic ink applied by means of a steel pen. In the case of skies a machine may be employed to rule a ground, and parts of this may be stopped out by the application of gum water before the inking has been performed.

When a sufficient number of impressions has been taken from the stone it is best to grind the impression off at once, as the longer the face of the stone remains charged with fatty ink on the one hand, or with gum on the other, so much deeper will these materials sink into its substance, and the labour of grinding will be proportionately increased. When, however, more copies are likely to be required the stone must be preserved, and, in order to prevent the ink of the design becoming extremely dry and hard, it is proper to roll the stone with a non-drying ink before storing it away. An ink of this kind is sold under the name of "preserving ink," or a mixture of one part of tallow and two parts of the ordinary printing ink may be employed. It is scarcely necessary to say that the stone should also be gummed before it is put on one side.

It very frequently happens that several copies of the same design are required on a stone, or that it is necessary to transfer a design or a portion of a design to a fresh stone. In either of these cases the subject on the original stone may be reproduced by means of a transfer or transfers printed therefrom. The best kind of transfer-paper to employ is a sized or coated india paper, which is to be obtained at the lithographic material warehouses. This paper should be very slightly damped by being placed between two layers of moist blotting-paper, after which the impressions from the original stone should be printed on its coated side, care being taken to obtain the best impressions which can be secured; and these printed transfers are to be put down on a fresh stone just as in the case of the original photographic transfer. When it is intended to make use of the transfers as soon as they have been printed, the ordinary ink may be employed; but when they are to be kept for some days it is well to employ a special transfer ink, which may be obtained from the dealers. If, however, it is intended to keep a transfer indefinitely the following mixture will be found to answer the purpose:—

Yellow wax	4 parts.
Shellac	2 „
Resin	2 „

Melt these together and add—

Tallow	2 parts.
Olive oil	2 „
Venice turpentine	1 part.

A transfer made with this mixture should be printed on the coated india paper, and every care must be taken to ensure a good impression, the printing compound being thinned with a little oil of turpentine, if necessary. The stone on which a transfer of this kind is put down should be heated more strongly than in the case of ordinary work, and the transfer must not be moistened. Under these circumstances only one pressure should be applied in effecting the transference, as the dry transfer does not adhere to the stone. It occasionally happens that the dry transfer will slide over the stone and destroy the design; but this can be avoided by the following expedient:—

Take two smoothly-faced sheets of paper which are rather larger than the backing-paper employed, and well rub the smooth faces of these sheets with French chalk in powder. Now lay the French-chalked surfaces together face to face, and then insert the pair of chalked sheets in the middle of the bundle of backing-paper. Under these circumstances any tendency towards slipping which may result from insufficient tension of the tympan, or any other cause, will take place between the French-chalked sheets of paper rather than between the stone and the transfer. When this device is resorted to it is often safe to apply several pressures to a dry transfer. The French-chalked sheets form a kind of safety-valve for slipping, and they are useful in many lithographic operations.

In the next chapter directions will be given for obtaining a transfer in grain or stipple, an ordinary negative from natural objects being employed; and after this the most usual sources of failure will be considered.

T. Bolas, F.C.S.

THE TECHNICAL MEETING OF THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.

In another page, among the reports of the meetings of societies, we publish an outline of what took place at the annual Technical Meeting, or Exhibition, of the South London Photographic Society. What follows here is merely a more detailed account of some of those articles exhibited. We commence with—

Special Cotton for Making Pyroxyline.

This, as we have said in our report, was exhibited by Mr. Payne Jennings on behalf of Mr. Leon Warnerke. Mr. Jennings's address was as follows:—

Mr. L. Warnerke, during his late tour in Russia, came across a specially-prepared cotton admirably adapted for making pyroxyline. I give at his request his own words on the subject:—"It is a matter of the highest importance in the manufacture of pyroxyline to use cotton easily permeated by acids; ordinary cotton in acids or any aqueous solution is permeated only with difficulty, and for this reason can be only put in in very small lumps at a time, and must be worked vigourously with the spatula. In the meantime, the conditions of the acids as regards concentration and temperature are changed, and the result is lacking in uniformity. To obviate this difficulty I have been in the habit of submitting ordinary cotton to the process of boiling in alkalies, by which means the silicious covering of the fibres of the cotton (or, as some persons prefer to affirm, the covering of vegetable wax) is dissolved by the alkalies, and the fibre is instantly permeated by water or acids. But the process of boiling in alkali, and subsequent washing and drying, is tedious and disintegrates the fibres; for this reason I was very glad to discover in Russia a product answering all the enumerated conditions ready-made, and by a process far superior to alkali treatment. This new product is called, rather inappropriately, "hygroscopical cotton," and is produced by the action of steam under heavy pressure and high temperature on the ordinary cotton. It is manufactured for dressing wounds, instead of *charpie*, which could not be produced in quantities sufficient for the requirements of the late war in the East."

To show you the difference between the ordinary (best medicated cotton) and the new Russian I dip these two pieces in the water, and you observe that while one goes instantly to the bottom the ordinary cotton floats on the surface indefinitely. The same result is observable when this cotton is dipped in mixed acid.

An Apparatus for Verifying the Coincidence of Focus in the Dark Slide and Ground Glass.—This is an apparatus I am requested also by Mr. Warnerke to show to this meeting—his absence in Russia preventing his doing it personally—for verifying the ordinary dark slide. It is customary to use a wooden lath, in the middle of which is placed a screw; the lath is put on the frame of the slide or ground glass, and the screw is worked till it reaches the ground glass, or a glass inserted in the dark slide. It is obvious that in the case where the slide rests upon the same support as the ground glass this process may answer; but in practice the position of the dark slide is generally regulated by the groove, into which the ground glass does not enter at all. This new apparatus gives the position of the sensitive surface referred not to two different surfaces of the ground glass and dark slide frames, but to one, viz., the camera front, and for this reason is superior; besides this, it indicates the difference (if any) in the most palpable manner. Mr. Warnerke required such an instrument as this for the verification of his roller slide, the extreme nicety of its action rendering it invaluable for that purpose.

On the instrument just referred to we may state that, in this country, where we possess camera-makers of so much experience and accuracy in construction, elaborate instrumental appliances for measuring the distance between the front of the camera and the surfaces of the ground glass, forming the focussing-screen, and the sensitive plate are not required. If any photographer be in doubt whether those two planes are coincident he has merely to lay a rigid lath or straight-edge across the focussing-screen, insert a long wedge-shaped slip of cardboard between the straight-edge and the ground glass, note how far it can be inserted, and do the same with the dark slide. The coincidence of the two surfaces may in this manner be ascertained with a considerable degree of accuracy.

HEMERY'S PATENT PRINTING AND TINTING FRAMES.

Having, subsequent to the Technical Exhibition, been afforded by Messrs. Marion and Co. an opportunity of examining Mr. Hemery's ingenious and useful printing-frames, we are in a position to give complete details of these exhibits; but the time occupied in the preparation of diagrams to illustrate their construction and mode of action is such as to compel us, very reluctantly, to defer the more complete description till next week, when it shall appear. In the meantime we give the following extract from Mr. Hemery's address before the meeting at the recent South London Technical Exhibition, premising that Mr. Hemery commenced his remarks by describing the action of the various parts of his printing-frames, which observations will be given, with the necessary diagrams, in our next number, confining ourselves this week to giving his general remarks on the subject.

Mr. Hemery observed that the frames introduced by M. Lambert were found, generally speaking, clumsy, awkward, and useless. For his own part, not wishing to exclude silver printing entirely from his practice, he wished for the means of adding the ornamental border, so attractive and effective, in the Lambertypes to his silver prints, which was not possible, or at anyrate practical, with the Lambert frames. The result was the new frames now before the meeting, and which, simple as they appeared in their perfected or matured state, had cost considerable time, and, more resembling the troubled surface of water on a windy day, was the medium from which the ornamental border was to be printed, and from which no amount of pressure would obtain a passable print. Under such circumstances, he (Mr. Hemery) bethought himself of collodion skins on which to print the ornamental borders, similar to the one he then held, which he handed to the President for examination. Such a substance was admirably adapted for printers' ink, and being, as it were, waterproof, not open to the objections he considered fatal to gelatine. Another great advantage was that the collodion skins could be fixed in optical contact with the glass on which they were mounted, becoming, in fact, a collodion negative. That was not the case with gelatine, as by no means was it possible to attach them permanently to the glass.

But perhaps the most important of all the advantages was the readiness with which autography could become a part of the portrait; for the collodion skin could be written upon with pen and ink as easily and with as much freedom as writing paper. Hence a new power was given to the photographer; for one has only to open albums to find constantly the autographs of people written on the card mounts with ordinary ink—a proceeding which, however interesting, is most inharmonious, the crude blackness of the ink killing out all the colour from the photograph itself.

Here, then, was a purpose indeed to which the new invention might be applied with the greatest effect. On that topic much might be said, for certainly a new field might open to the photographer which up to the present, in consequence of the many difficulties presented, had altogether been unexplored, or, if attempted, abandoned, from the very nature of the constant and vexatious failures attending the effort. How greatly enhanced (Mr. Hemery continued) would portraits become by bearing the signature of the person pourtrayed! In the family circle a certain degree of affection is entertained even by the remotest members of relationship, and the sentiment of reverential love always inspired by coming across accidentally an old letter bearing the signature of a deceased father or mother, sister, child, or brother. Apart, however, from the natural promptings of family affection, there is a still broader field afforded by those who make their mark in the contemporaneous history of the world; and the curiosity to see the lineaments would be equalled by a desire to possess the handwriting of "fortune's favourites," if the means were equally available of gratifying the wish. For instance: if Her Most Gracious Majesty permits her loyal subjects to possess her portrait, it is not too much to think that she would also graciously permit them to have what they would perhaps prize as much—her autograph. Who would not value such an autograph as "Albert Edward, P.?" or such as could be afforded by our British statesmen, from their own hands and pen? The arny, the navy, the clergy, the leaders of science and art, the eminent of every profession, would each furnish names that the public would be proud and eager to possess without any degrading or fulsome homage.

That being so, it seems strange that no effort has hitherto been made to bring out such a portrait as the "photo-autographic;" but, however it may have been, whether from difficulties imaginary or real, it is now, at anyrate, easy of accomplishment, and, by the new "lock-automatic," as certain in result as an ordinary print would be.

The collodion skins are supplied to the photographer mounted on good stout paper, so that they may be handled freely and fearlessly, and offer as suitable a surface for writing upon as a sheet of writing paper.

The designs are various, and a tablet is left in which the signature is made. The collodion being transferred to the glass carrier, it is obvious that no further trouble is occasioned than the tinting of the portrait occupies, and the signature being white on a delicate tint of the same colour as the portrait itself, the picture and autograph are in *complete harmony*, and very ornamental, real, and characteristic.

The value of such a portrait can hardly be realised. As a matter of family sentiment it cannot be over-estimated; but with those whose fame is cosmopolitan, and who are the common property of the world, its importance, whether living or posthumous, is beyond doubt so illimitable that a source of profit may be "tapped" to which many may, perhaps, be strangers, by the most insignificant negative in his possession. At anyrate it only remains with photographers to introduce the photo-autographic portrait to the public, and they will soon reap the harvest always accorded to novelty and enterprise.

As we have stated, the mechanical details of Hemery's frame or pair of frames—for it is a binity in unity—will appear in our next.

MORLEY'S PORTABLE CAMERA-STAND.

This is a useful and simple form of camera-stand which may already be known to some of our readers, but of which, in the interests of many others, we shall give a full description, with a diagram, next week. Owing to a "conveyance accident" it did not reach the meeting in time to be exhibited, but we are happily in a position to give a detailed account of the apparatus; for we know that every improvement or modification of existing apparatus is watched with interest by our numerous readers.

EXPERIENCE WITH BEECHEY EMULSION PLATES.

Two years ago last summer I procured some of this emulsion from a commercial source, and having prepared some plates I exposed one or two with Kennett gelatine and Liverpool plates. I found them slower than I had expected, and obtained pictures which, compared with the others, were hard. I could not continue my experiments at that time; camera and plate-boxes were packed away with the Beechey, the Kennett, and the Liverpool plates, together with some of the latter that had been prepared the previous summer. Since then, until last summer, I worked with another size of camera and plates.

Last summer, however, they were brought out again. The Kennett and Liverpool plates abundantly vindicated their keeping properties, as I knew already they would do; but I was very curious to learn how it would be with the Beechey plates. My exposure of the first plates proved much too short, and several plates were more or less spoiled by dust; yet there were not wanting signs that with proper exposure very clear and vigorous negatives might have been obtained. With my moist plates—to which I gave a longer exposure—I exposed, also for a shorter time, one of the same kind that had been recently prepared. My subject was the Grand Hotel at Eastbourne. The last-mentioned plate gave me a negative equal in every way to my wishes; and the former, were it not for dust spots and rather too short exposure, would have given me a negative equal to it. I had not opportunity for more crucial experiments with the remaining plates of that batch; but, speaking for myself, I feel little doubt of the keeping properties of such plates when certain precautions are taken in their preparation. The slowness of the plates when first prepared, the hardness of the pictures, and the long exposures required for the plates which had been kept, seem to point to rather a large excess of bromide in the original emulsion. The question is as to how they would keep if that were reduced to a minimum.

Last spring I worked with plates of the same kind prepared—some from emulsion which I had bought and corrected, some from emulsion which I had made towards the end of summer, and I worked with others which had been prepared for me. I found the whole of these plates capable of furnishing excellent negatives with very moderate exposures. I discovered, however, one cardinal point in connection with them, which I have since heard mentioned as a defect by others. Examining the films by transmitted light some appeared perfectly homogeneous, and I think that from such there should be no difficulty in obtaining perfectly clean negatives. In other films there is a mottled appearance, either partially or entirely covering the plates.

When I first prepared the Abney beer-and-albumen plates with the silver bath I met with an appearance in many of the films very similar to the above, and drew certain conclusions as to the prints in which the preparation had been defective. With many of the last-mentioned Beechy plates good negatives may also be obtained. In developing, endeavouring (as I was doing with all my plates at that time) to obtain very considerable intensity without after-intensification, I found, when the developer had reached a certain strength (short of that prescribed) and the development had proceeded to a certain point, an abnormal reduction begun in the spots I have mentioned, and spread itself rapidly, so that very soon a reduction would have taken place through the whole film. When I saw this commencing I washed and fixed as quickly as I could, and in many cases my negative was saved. I noticed also that where the abnormal reduction had not commenced the hyposulphite cleared the whole away, so that there was no longer any mottled appearance left in the film. Also, the abnormal reduction more often begins in the sky; so that after fixing I have only a mottled sky and a perfectly clean negative in other respects. This is entirely the case with those of the plates more recently prepared for me which presented the mottled appearance. The sky being most affected in this way may arise, either from my placing the plate so that the part most mottled comes in the sky, or because the light has acted most strongly on the sky.

The questions I ask and the conclusions I draw from this experience for my own guidance in the future—and which I now write down for the benefit of any to whom they may be of interest or of value—are the following:—What is the cause of this mottled appearance? How can it be avoided? And how can the best negatives be obtained from the plates in which it has not been avoided?

The fact that it is only after the developer has been on the plate for some time seems to show that the cause must lie on the very underside of the film, which the developer has to penetrate before the cause can operate. The fact that some films are without the mottled appearance altogether seems to show that the cause has been removed entirely from these. How? I think that in the preparation they must have been plunged into the water before the film was too far set for the water to operate right through; also, a longer washing in the different changes of water may have fallen to their share. At anyrate, the next time I prepare Beechey emulsion plates I intend to plunge them into water the very first moment the film will bear it, and to take care that they have a thorough washing.

Next: for any plates in which the mottled appearance may show itself notwithstanding, I shall no longer seek to obtain great intensity by the alkaline developer alone, but, taking care to wash it off before incipient reduction about the spots can commence, shall build up my picture afterwards, if necessary, by silver intensification, obtaining doubtless, although with more trouble, a better picture than I could in many instances obtain by the alkaline method alone.

There is one fact connected with my own operations which I ought to point out, because many, operating differently from myself, may possibly have a very different experience. My exposures are longer than many give, and I begin with a weak developer, gradually strengthening it; but where a strong developer is prescribed—as for the Beechey plates—I seldom require to bring it up to the strength. I say this is my usual, not my invariable, practice. In cases, for instance, where I do not succeed by this method I go back to the very letter of the formulæ. With regard to the Beechey plates, I think, perhaps, by giving the shorter exposure and applying at once a developer of full strength in the first place, the light, having acted less powerfully on the sensitive particles in the film, the by-products left at the bottom of the film will have less power to cause abnormal reduction; and, in the second place, the developer doing its work more rapidly (though this will be somewhat neutralised by the shorter exposure) will not require to remain on the film so long, and so not have time to penetrate it completely. If this be the case—this being, probably, the more ordinary way of working—the majority of workers may have remained strangers to these objectionable spots.

For myself, I cannot help thinking that if a slight excess of bromide obtain in the finished emulsion, and if the washing be carefully performed and the drying afterwards properly managed, these plates should have good keeping qualities. I say the drying also "properly managed," for one reason among others, because I found on some of the plates which I first prepared, on bringing them out last summer, a fungoid growth exactly like that which I had previously found on some of my gelatine plates in which beer had been mixed with the water used to dissolve the gelatine. The drying should be at a temperature not too high, continuous, and complete within a given limited time.

WM. WASHAM.

NOTES FROM AMERICA.

SPOTTING OUT PRINTS.—THE FRENCH EXHIBITION.

On the subject of "spotting-out" prints Mr. S. M. Robinson writes:—

Since I wrote you *(Phil. Phot.)* about spotting prints for burnishing I have tried some experiments. Take an egg, beat it thoroughly, let settle, then take such colours as you want (india ink being the base); rub them with the albumen on a palette, and let dry. When wanted for use have a little ammonia and alcohol, equal parts; dip your brush in the solution, then rub the colour previously dried on the plate (palette). This will adhere readily to the print. Do this before putting on the soap and alcohol, or lubricator. I find it just the thing. It leaves no dead spots.

Dr. Vogel, the German correspondent of our Philadelphia contemporary, has sent to it a detailed and graphic account of the Paris Exhibition, which we believe will interest many of our readers. It will be seen in what high estimation he holds the English landscapes:—

I have spent a fortnight in Paris, and have gathered with great pains a general idea of the immense mass of photographic material stored in the Exhibition. As to the Exhibition, it surpasses, as usual, all previous ones in magnificence and greatness. The French photographic department is as large as the whole photographic pavilion at the Philadelphia exhibition. The exhibits of other nations would take up an equal space. These are scattered over the whole Exhibition—found once among a pile of furniture, once surrounded by show-cases with soap, brushes, combs, &c. I do not exaggerate when I claim to have seen more than ten miles through the buildings before I had seen all the photographic products. The trouble is that there no such facilities here as there were in Vienna or Philadelphia for the purpose of reaching the different points of the Exhibition. In Vienna was a street-car, in Philadelphia a narrow-guage railroad; here are nothing but rolling-chairs, which one rather leaves to ladies or sick persons. In the Rue des Nations, in the neighbourhood of the fronts representing buildings of different nations, the photographs are generally found. Only the Austrian photographic exhibit is in a separate pavilion. As might be expected the exhibits consist principally of portraits. A glance at the same will tell at once that there has been no great success made. Old-known firms maintain their reputation. There is Sarony, Rocher, and Gutekunst, in America; Reutlinger, Walery, and Lumière, in France; Luckhardt and Adèle, in Austria; Bergamasco, Mietzokowsky, &c., in Russia. All these are well-known names, whilst there are still others from every country who have exhibited some excellent works. One is vainly searching for a new style or a shape. A surprise like that by A. Salomon, who made a *furore* in 1867, is not to be had, and even A. Salomon has not exhibited at all. As real novelties in the portrait line there are only two kinds to be mentioned. First, the Seavey background, which you know so well that I need not stop to explain them. Second, the portraits with electric light, by Vanderweyde, of London. Both were known before, but none of them have ever been exhibited before at a European exhibition. As to the backgrounds, it is strange to observe that only one European (a Parisian stock-dealer) has exhibited backgrounds, which are, however, so beyond all expectations dreadful that one cannot help being astonished at the fact that these things are possible in Paris—the centre of taste. Even a German country photographer would be ashamed to use such backgrounds. It is, therefore, not at all surprising to see but very seldom a painted background on a French photograph. Let us hope that the French—and other nations too—will profit by Seavey's exhibit. Vanderweyde's exhibit proves it to be a possibility to make equally good pictures by electric light and daylight. Since through the Parisian Exhibition vitality has been given to a new, interesting method of using electricity for illumination, it is to be expected that this light, which may be produced with a few horse-powers, will soon attract the attention, especially in the northern parts of Europe—Russia, Sweden, &c.—where there is sometimes only four or five hours' daylight during the winter months. America, which is blessed with an abundance of daylight, will not have any occasion for the use of electric light for portrait work. America has sent some really good work. Sarony, with his inexhaustible ingenuity, always brings something new in positions; Rocher occupies his space with pictures of finest finish; Landy brings his well-known *Seven Ages of Man;* and Gutekunst his panoramic view of the Centennial Grounds of Philadelphia, and some very good cabinet pictures, which seem to have the background retouched in. Sarony exhibits crayons; Gubelman, of New Jersey, brings elegant cabinet pictures, smooth in the centre and grained toward the illuminated edges. He also exhibits nice pictures of children. Gueria, of St. Louis, arranges men as marble statues. It shows too well that many men have a weak chest. These make-up things do not look altogether nice. More lucky is Smith, of Chicago, who has sent a large number of pictures of children, which can compete with the best pictures of the kind. Under the frame is printed—"We came all the way from Chicago." The large views of the Centennial Exhibition exhibited by the Centennial Photographic Company, Edward L. Wilson, proprietor, Philadelphia, are admirable, and far ahead of any pictures made of the Paris Exposition, both in quality and size, and they make one wish that the same company had had the management of the exposition of photography here, and thus continue their fame. I see nothing in the line of exteriors and interiors of buildings to equal them, and certainly no world's fair was ever so well photographed as the one at Philadelphia by the Centennial Photographic Company. As you see, the representation of American photography is very moderate; many well-known names, as Kurtz, were not represented. So it is with Canada. Notman and Sandham occupy the first place with their well-known winter scenes and cabinet pictures, *à la* Salomon. Laughlin, of Ottawa, exhibits views of architecture which have a respectable finish. Henderson, of Montreal, has sent very nice landscapes, among which are some taken by the emulsion process. Gurney, of New York, has exhibited burnt-in enamel photographs much better far than those exhibited in Philadelphia. According to the number of French enamellers it seems as if this kind of business were picking up; I counted not less than fourteen exhibitors, among which the oldest of all burnt-in photographers was M. Lafon de Camarsac, whose process is still a secret. He sends pictures of life size, which did not please me as well as the smaller ones. I consider those of M. Deroche the best. These pictures guided me involuntarily to the French department, which may have the most interest for you, with the exception of the American department. I allow myself, therefore, to continue relating what I have seen from the French. The French department is crowded with portraits, leaving hardly any room for the landscapes. Lumière and Victor, of Lyons, attract principally attention with pictures of the size of a whole sheet, though there is nothing new in regard to position or light. They occupy the corner of the main aisle, which is greatly to their advantage. In nearly all the departments of the Exhibition the top light is shut off by means of white screens, which are double along the sides of the rooms, where they shut off a great deal of daylight, and work very disadvantageously on photographs exhibited in that neighbourhood. Walery's frame, for instance, is at times half in the dark. He exhibits small pictures, which are better than those exhibited in Philadelphia. Reutlinger is represented with small and large pictures, all equally well. A special interest is excited by some large pictures of his, made by the carbon process. Nadar, who did not exhibit at the last two exhibitions, appears again with an excellent tableaux of pictures, remarkable by their good light. Rembrandt celebrates here his triumph. The effects of his pictures are multiplied by the well-chosen positions. However, they smack a little too much of the *demi-monde*. As it is not necessary to mention every one of the French photographers, I confine myself to saying that the average of the work exhibited is very good, though there is nothing new; on the contrary, the general impression is rather fatiguing, as there is too much of the same kind without variety. The "lightning" process, which excites nearly the whole of America, is scarcely represented. The best occasion to study it was with M. Klary, the apostle for this process. He offered me at once to make some experiments, to which I might sit as model. The skylight, covered with ground glass, was open; only one screen shut off a part of the top light; the day was clear. Several experiments were made, and it was found that those with five seconds' exposure for card size and eight seconds' for cabinet size were the best. Both were made with a Dallmeyer three B lens, of twenty-four centimetres focus and three seconds' opening. The plates were sensitised by Klary himself for an unusual length of time, and on developing the picture appeared a little hard and intense. Klary told me that his collodion was rich with bromide salts, which would explain the long sensitising. He added then that his chemicals were not in their highest state of sensitiveness. In connection with the above I would like to say that there is in Paris still another instantaneous photographer, M. Chambay, who stops in the Grand Hotel. His exhibit is composed of a number of pictures of babies, among which are groups of four to six of them. The unexpected sharpness of every one of the babies speaks for itself. There is no other explanation for the probability of making such pictures than the short exposure. M. Chambay keeps his invention secret, and has even declined the highest offers made for the sale of his method. A third one among the lightning men is M. Richard, in Switzerland, who, following the example of Boissonnas, offers his process for sale. I do not doubt that after a short time there will be still some more similar processes in the market. The carbon printing process has found in France quite a number of admirers. Liebert, formerly in America, works exclusively with this process. Reutlinger has exhibited a large carbon print. Rousseau, Provost, Cavett, Frank, Fabre, &c., exhibit carbon pictures; some of them are in life size and very good. Braun, of Dornach, is ahead of all. His branch house in Paris is the former firm of Meyer and Pierson, who made principally painted carbon portraits. Those exhibited by Braun are slightly painted on the back before the second transferring. In some of them only flesh and hair are painted. The effect is generally very good, but sometimes a little cold, which may be attributed to a little grey tone of the carbon paper. I remember that Ott had sent to the Philadelphia exhibition some small pictures of the same kind. They arrived there in the month of June. Braun has been lucky to take the oldest of the crowned heads of Europe—the Emperor William I., and also Pope Pius IX. and Leo XIII. The two latterp arade on the Exhibition in life-size, the Emperor not. Braun's masterpiece is a picture two metres (4′ 7″) high, representing the Medzäro Grave, of Florence. Alongside of them are some other very interesting reproductions, all made in Dornach, now belonging to Germany; and I am curious to know if this work can be put in competition for the award. The result of the work of the judges is not known yet. M. Gombetta, *le vrais representant de la republique* (the real representative of the republic), as the French call him, was the cause of the delay of the distribution of the awards until after the *corps legislatif* has gathered. If the portraits are amply represented, the landscapes, on the contrary, are much neglected in the French department. There is one thing certain: nobody has ever done better landscape work than the English. Among the French exhibitors Lamy is the best; then follows Thiers, of Fontainbleau, with dry-plate emulsion plates. More neglected than the landscape is the architecture. Anybody having seen the excellent architectural work which Baldwin and Ferrier and Soulier exhibited ten years ago will be surprised, when seeing in the work of a photographer, *des ponts et chaussees* (of bridges and turnpikes), the vertical lines merely converge with the edges of the pictures. Lichtdruck seems to have found not many admirers in France. They have not even a term for it, as they call it simply "photolithography," though lichtdruck and photolithography are two different things altogether. When Poitevin, with his gelatine and chromate solution on a stone, exposed under a negative, developed, inked-in, &c., he attributed a great deal of his success to the operation of the stone. Later the stone was replaced by a zinc plate; but he knew not that the gelatine film by itself has all the printing qualities. Tessié du Mothay was the first who proved this with certainty, and was recompensed for it with a gold medal at the exhibition of Paris in 1867. By that time the French knew very well the difference between photolithography and phototype, as Tessié names his process; now they have forgotten all this, after Albert has given vitality to Tessié's method. "*C'est le procede Poitevin*" (that is, the process of Poitevin) was the reply when I spoke of Albertype, not knowing Tessié's, the Frenchman's, merits. I found only five or six exhibitors of lichtdruck—Berthaud, with architecture, among the rest. The Woodbury process is amply represented by Goupil, Vidal, &c. It is owing to Goupil's success that the Woodbury process has found so many admirers in France. He exhibits here equally as well as in America. The Woodbury prints form the frame of his magnificent tableau, and in the centre are photo-engravings as sole novelty. I saw two coloured pictures in which the colours seem to be put on by inking-in of the printing plate. If Goupil has made any progress it is principally due to the chief of his establishment, M. Rousselon, who has at his disposition the immense means of the house, which enable him to make the experiments which a poor devil of an inventor generally cannot make. Goupil's establishment, in Asnières, is magnificent indeed; one hundred and thirty workmen are constantly working in one great room with a skylight on the top. A gallery is established in the same for the purpose of mounting the pictures. For printing they have eleven large copperplate printing presses, and six tables for the Woodbury process. Every workman is able to make two hundred prints daily on either machine—20 × 60 centimetres large for Woodbury prints, 60 × 85 centimetres for photolithographs. The well-known method for the preparation of the Woodbury printing plate by means of his gelatine film requires one million pounds of hydraulic pressure. For plates larger than 20 × 60 centimetres this pressure is insufficient; that is the reason they then use the photolithographic process, where the plates are made by means of galvanoplastic. Goupil's principal occupation is the reproduction of paintings, which are taken in the open air. Only in bad weather a skylight is used, which is glassed all round. Rousselon told me that he does not retouch his negatives, and also showed me some negatives which got, indeed, no retouching whatever; but I saw, also, many negatives which were considerably retouched. This is, however, without any consequence, as it is certain that all his work is very good. Rousselon told me, also, that he overcomes the injurious effects of the different colours by the different proportions of bromine salts and iodine salts in his collodion; also by making several trials with different exposures. I give you this apparently doubtful assertion, as it has been given to me, with all reserve. Next to Goupil is the *Societe Anonyme des Publications, Periodiques, Photographique, et Photochromique*, which attracts most attention. This establishment is managed by Vidal, and manufactures principally coloured pictures. The same firm exhibited also in Philadelphia, where its success was not altogether decided, especially in regard to the portrait work. Their principal occupation is now reproduction of articles of art and industry, and I must say it is a success. Reproduction of gold and silver signs are really so well done that one should think they were made of metal. Other pictures, in four colours, are an equal success. The same establishment also makes Woodbury prints and lichtdrucks. The English method for the manufacture of coloured pictures is more direct and simple. The photographs are simply painted over; then it seems to be a success, according to what I saw exhibited at the South Kensington Museum. Since I stopped so long with the coloured pictures I dare not forget to mention the photographs in natural colours, by Ducos du Hauron. He has a competitor, M. Cros, unknown to me until now, whose process does not differ from that of Ducos du Hauron as far as the optical part is concerned. In contemplating their pictures I must say that I was greatly surprised in comparing them with Albert's and Obernetter's work, who are far ahead of Ducos du Hauron. Landscapes after nature are principally inferior. Better are his reproductions of oil paintings. In my next letter I propose to write about the French heliographs, and also about the photographs of other nations.

OPINIONS OF THE LONDON PRESS ON THE PHOTOGRAPHIC EXHIBITION.

The Photographic Exhibition.--One of the most attractive and interesting exhibitions yet given by the Photographic Society of Great Britain has been daily bringing numbers of persons—directly and indirectly concerned in the advancement of this modern art of heliography, with its many branches—to the gallery in Pall-mall East. With an æsthetic conservatism deserving the greatest respect, the council of this institution has heretofore jealously refused to admit hybrid specimens. This reserve was commendable so long as it was practicable; and even now the exclusion of hand-coloured photography, however skilful and artistic, from an array of examples purporting to be strictly the result of light acting upon certain chemicals, is well warranted. It is, however, becoming more and more difficult to distinguish between the photography which is pure and simple and that which admits combinations. On the staircase of this gallery are hung certain pictures which might very well pass as consummately dexterous copies of original works by the great masters; and on reference to the catalogue these are found to be poikilographic paintings, produced by the Lombardi Art Company. There is no inscrutable secret as to the means adopted in the production of these admirable transcripts, although the process, in certain of its details, is in the exclusive possession of the company above named. Moreover, a trained capacity of dealing with pigments, and of managing the niceties of gradation in light and shade, is so imperatively needed to ensure the artistic success of poikilography that, unless ruled and directed by the highest judgment and taste, the whole virtue of the operation would speedily disappear. Under Signor Lombardi's careful control the finest results are attained; and the inestimable value of the process as a "worthy means of conveying to those who cannot see the original pictures a good idea of their colouring and effect, and thus of spreading a knowledge and appreciation of the higher forms of painting," is verified in so many words by no less an authority than Mr. F. W. Burton, R.H.A., F.S.A., the director of the National Gallery. By way of demonstrating the capability of the poikilograph in its direct application to living portraiture on canvas, a charming picture of Miss Curwen is placed in companionship with *facsimile* representations of the art of Rubens, Holbein, Mieris, and Siebold, from their treasured works at Dresden. Conspicuous among the examples of photography proper on the walls of the present exhibition are portraits by Lombardi and Co., either from their Brighton studios or from their establishment in connection with Messrs. Colnaghi's Art Gallery in Pall-mall. Carbon enlargements and exquisitely-finished portraits on "opal" are shown by the firm, chief of whose subjects are Lady Beaumont, Major-General Guise, Colonel Taylor, M.P., King George of Bonny, Signor Zambra, Lord Folkestone, the Rev. J. Cumming Macdona, and Mr. J. Bond, of the British Museum. The Woodbury Company's photographs, printed on their effective tissue, are prominently meritorious objects of the Exhibition, their portraits, including one of Mr. Henry Irving, being exceedingly lifelike, while their copies of such works of art as Sant's picture of *Adversity* show how the difficulties of rendering a composition of colours into monochrome can be overcome. A series of views in the Paris Exhibition, and especially in the "Avenue of the Nations," is exhibited by Mr. William England; an extraordinary collection of Russian photographs, from the War Department and Imperial State Paper Manufactory of St. Petersburg, is lent by Mr. L. Warnerke; and the names of Vernon Heath, Marion and Co., Lock and Whitfield, Chaffin and Sons, R. Slingsby, Boucher, Payne Jennings, and Ezra Greaves are well accredited by corresponding works in the Exhibition.—*Daily Telegraph.*

Our Editorial Table.

Flowers: their Origin, Shapes, Perfumes, and Colours.
By J. E. Taylor, Ph.D., F.L.S., F.G.S., &c.
London: Hardwicke and Bogue.

When we gave a description, in a former volume of this Journal (page 457, vol. xxiii, and subsequently), of certain examples of *heliochromie* executed by M. Leon Vidal, attention was directed to the remarkable facility offered by the Vidal process of producing photographic prints of flowers, possessing not merely the accuracy of form and of light and shade but also the rich colours of nature. One such example of this application we have in our possession. A difficulty appears to have been experienced, and up to the present time it has not been overcome successfully, of applying Vidal's system to book illustration. Not, of course, that it cannot be done, but the time has not yet arrived when large numbers can be produced at a price to render it possible to illustrate a moderately-priced book in this manner.

The elegant work before us contains thirty-two coloured figures, by Sowerby, and over a hundred and sixty woodcuts, all these being so carefully drawn and shaded as to convey a singularly accurate idea of the flower or part of flower represented. Dr. Taylor possesses the happy faculty of expressing his ideas in terse language which no one can fail to understand. As a champion of the new evolutionary views now so generally accepted by men of science he, in treating of the subject of flowers, contrasts the new with the old philosophy to the undoubted advantage of the former. "We hold," he says, "that, even now, in the minds of the most intelligent and thoughtful, and before long in those of the average educated, the new philosophy of flowers will excite more reverence and admiration of creatorial wisdom than the older teachings could educe, and that also in directions which the old views could not possibly indicate. The teachings of modern botanists and naturalists concerning flowers and insects are of a higher and more spiritual kind than those they have replaced; and the whole subject has been lifted to a higher and broader platform, whence a better and clearer view can be obtained of the subjects discussed and their general and special meanings."

This excellent and useful work, which has reached a second edition, will find admirers among all lovers of flowers who have even the slightest *soupçon* of science in their composition, and to these we cordially commend Dr. Taylor's elegant volume.

The University Magazine.
London: Hurst and Blackett.

The November number of this popular monthly is illustrated by a portrait of Mr. William Morris, M.A., a sketch of whose life and labours forms No. 11 of the new series of *Contemporary Portraits.* A scholar, poet, artist, and manufacturer, William Morris is indeed a man of no ordinary kind; but with him in these characteristics we have nothing to do. His portrait displays a man possessing those physiognomical and phrenological peculiarities which, if these be admitted to be reliable and determined departments in the family of the sciences, are bound to lead to success. There is no indication by whom the negative (cabinet size) was taken, but the Woodburytype Company have printed it in their usual perfect manner. The *Notes and Reminiscences*, by the late W. H. Harrison; Mabel Collins's *In this World* (concluded); and *An Appeal Against the Judgment of Malthus*, by Eric S. Robertson, are among the other articles.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 28 ..	Liverpool Amateur (Ann. Meet.)	Free Library, William Brown-st.
,, 28 ..	Oldham (Annual Meeting)	Hare and Hounds, Yorkshire-st.

TECHNICAL EXHIBITION OF THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The annual Technical Exhibition of the South London Photographic Society was held in the large room of the Society of Arts on the 14th inst.,—Mr. Le Neve Foster in the chair. Mr. William Brooks acted as assistant chairman, to explain such technicalities as might be necessary.

The Chairman having briefly explained the nature of the exhibition,

Mr. John Werge exhibited several enlargements printed from negatives the backs of which had been covered with plain Rive paper and then worked upon by a stump. He also exhibited three gelatino-bromide negatives, one of which had been developed with alkaline pyro., the second by Mr. M. Carey Lea's ferrous-oxalate developer, and the third by pyro. followed by the oxalate. He also exhibited a pneumatic plate-holder.

Mr. George Smith exhibited, on behalf of the Sciopticon Company, one of their new forms of lantern, in which the relation of the picture to be presented to the condenser may be altered. He also exhibited a registering slide-holder for the lantern, and one of Chadwick's oxygen retorts and reservoirs.

Mr. T. Bolas directed attention to several coloured prints in fatty inks by Mr. Pouncy, of Dorchester. These were suspended on the wall.

A model of a double dark slide was sent by Mr. Penny, of Cheltenham, and explained by Mr. Baynham Jones, of the same town. Later on in the evening Mr. Jones exhibited a curious example of "frilling" which occurred on one of Swan's plates.

Specimens obtained by the patent "luxograph" of Messrs. Alder and Clarke were exhibited by that firm, who invited the members to visit their studio in the neighbourhood at the close of the meeting, and see for themselves the working of this apparatus for taking portraits by artificial light. A description of this instrument appears in another column of the current number of this Journal.

Mr. T. G. Hemery exhibited a printing- and tinting-frame, of which some account will be found in another page.

Mr. Payne Jennings, on behalf of Mr. Warnerke, who was absent on the continent, exhibited a sample of cotton wool possessing a high degree of value in connection with the preparation of pyroxyline, inasmuch as it was so completely freed from greasiness that it became at once amenable to the penetrative action of the acids. This change was produced by the action of steam under high pressure. The difference between it and the common cotton was shown by a tuft of each having been thrown on the surface of water in a glass tumbler, when the altered cotton immediately sank to the bottom, whereas the common sample seemed to repel the water and remained floating. An apparatus for ascertaining the coincidence of the planes of the ground glass and the sensitive plate in a camera was also exhibited.

Mr. Cowan, of Messrs. Hills and Saunders, Porchester-terrace, exhibited a studio camera fitted with his patent electric shutter. He also exhibited a copying camera fitted up with great ingenuity, which elicited a hearty round of applause from those present. Mr. Cowan further exhibited and explained the nature of a slide for cutting glass plates to any required size, concluding by showing a body-rest possessing some valuable features.

Mr. F. York exhibited an ingenious plate-cleaning desk designed by Mr. Oakley; also several specimens of glass varnished by a non-actinic varnish prepared with Australian "black-boy" gum.

Mr. J. L. Lane exhibited and explained the use of a printing- and tinting-frame of peculiar construction which he had devised.

A background of "Empire cloth" was exhibited by Messrs. J. Avery and Co. In reply to a question it was stated that it was supplied in various widths up to six feet, and in many different colours.

Mr. W. M. Ayres exhibited an end-grain block of wood upon which to cut and trim photographs; also a set of measures for cutting a sheet of paper without waste. [An article descriptive of these useful articles will be found in a previous number of the Journal—that for February 15th of the present volume.] Mr. Ayres also exhibited a glass vessel for pouring collodion. It was not unlike a teapot in form.

Messrs. Marion and Co. sent for exhibition Cadett's pneumatic shutter; a dancing figure moved by means similar to the shutter and useful for attracting the attention of children while being photographed; also a quantity of spun glass wool for filtering, and one of their improved rolling-presses.

Mr. William Brooks exhibited prints from reproduced negatives; carbon transferred transparencies; some reduced photographs from rubbings from monumental brasses, taken by Mr. Tom Brines; together with a set of the photographs of the caves at Reigate to which special attention has already been directed in this Journal.

The proceedings concluded by a magic-lantern exhibition of Woodbury transparencies by Mr. George Smith, which terminated a pleasant evening.

Votes of thanks were given to all the gentlemen who, by their exhibits, had conduced to the pleasure and instruction of their fellow-members.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held at the Memorial Hall, on Thursday, the 14th inst.

The Council had previously met at six o'clock, when Mr. Alfred Brothers, F.R.A.S., Vice-President, occupied the chair. In consequence of Mr. Thos. Heywood, who had been elected President at the previous meeting, refusing to accept that office, on account of ill health and inability to attend the meetings, it was proposed and seconded that Mr. Charles Adin, the late Secretary, be elected President, which proposal met with unanimous support.

At the subsequent general meeting of the members Mr. Brothers again took the chair, and the minutes of last meeting were read and passed.

The Chairman then communicated to the members the refusal of Mr. Heywood to accept office, and also the appointment of Mr. Adin as President.

The latter announcement was received with great satisfaction by the whole of the members; whereupon Mr. Brothers retired in favour of the new President, who took the chair amidst cheers.

Mr. G. T. Lund, Vice-President, in a short and graceful speech, then introduced a "*secrétaire*," consisting not only of a most convenient writing desk but also forming a handsome piece of furniture, the result of a subscription made by Mr. Adin's warmest friends, and which was then presented to that gentleman in the name of the Society, as an acknowledgment of eleven years' diligent services as Secretary.

The Chairman said that, though somewhat unprepared for the honour they had confided by electing him President, he must tender his most sincere thanks for the very kind manner in which his friends came forward with their testimony of esteem, and, in a very amusing manner, he (the Chairman) recounted some pleasant reminiscences connected with his former office, but reserved for the next meeting his remarks in reference to his election as President.

The following gentlemen were duly elected members:—The Rev. F. E. Waldie, Mr. James Shepherd, C.E., Mr. W. B. Wood, and Mr. J. W. Wade.

Mr. Oakes read a second communication on *Combination Printing for the Stereoscope*, which will appear in our next number, and illustrated the same by a large collection of stereoscopic transparencies (the production of the late Mr. Breese), some apparatus, and several drawings and diagrams, and concluded by promising upon the next occasion, which would conlude his communications on the subject of stereoscopic transparencies, to print one or two before the members.

The Secretary then read a letter received from the Liverpool Amateur Photographic Association, to the effect that a negative of a group, taken on the occasion of the joint excursion of the two societies to Hawarden by Mr. W. E. Potter, had been sent down with permission for any of the members who wished to possess a print. Mr. Gregory then very generously proposed to supply prints gratis to all the members who desired to possess one.

A lantern slide was next shown by aid of the sciopticon. This was also a group taken at Hawarden, on a Kennett plate by Mr. L. W. Weber, of Liverpool, and was much admired.

Mr. Brothers exhibited a very novel clock dial arranged for use in portraiture, constructed for him by Mr. Cussons, of Southport. The points of novelty in the apparatus were that the dial was covered by a black disc through which a small square aperture was cut, and only permitting one figure of the white dial to be seen at a time; and by a ratchet wheel and spring at the back (under the control of the operator) it was so arranged that the disc could revolve, thus exhibiting the figures on the dial in succession. The object of the apparatus was that, whilst fixing the attention of the sitter, it gave relief to the eye by following the aperture through its circular motion.

Mr. John Holden said he thought that the pupil of the eye would be enlarged by following the circular motion of the disc.

Mr. Brothers explained that by reason of its small diameter (about five inches) and the distance of the sitter no enlargement would be perceptible.

Several of the members very much admired the apparatus, and expressed a desire to possess one.

Mr. W. J. Chadwick (the Secretary) exhibited some excellent coloured photographs of the Crystal Palace, by Messrs. Negretti and Zambra—one of the Egyptian court exciting universal admiration. He also exhibited a quantity of specimens of a new process in photography, invented by Mr. W. B. Woodbury, representing water-marks in ordinary writing paper, and also a lamp which he (Mr. Chadwick) had devised for burning house gas in the sciopticon. The lamp was on the argand burner principle, but instead of giving a circular flame it was arranged to give two flat flames, as in the sciopticon lamp. A square chamber (similar to those in oil lamps) was provided, and he explained its superiority when this chamber was filled with benzine or mineral naphtha, but stated that he had not yet been able to obtain so good a light as with the sciopticon oil lamp, though very much superior to the ordinary argand burner.

Mr. M. Noton thought if small pieces of coke were introduced, so as to absorb the carbonising agents, the evaporating surface would be much increased and a better light thereby obtained.

After some discussion between Messrs. Noton, Watts, Oakes, and Chadwick, Mr. Noton offered to try a few experiments with the lamp and report the results at the next meeting.

Mr. J. Leigh exhibited a washing box for paper prints, which consisted of a square box on the syphon principle, with trellis-work trays, for the purpose of keeping the prints separate when washing. The same gentleman also exhibited a very simple, inexpensive, and effective "back-pressure valve," constructed of glass and india-rubber tube, similar to that in Bunsen's pump.

A carbon photograph was then passed round—the presentation picture of the Edinburgh Photographic Society, which had been kindly sent for the Society's portfolio.

Votes of thanks wese passed to Mr. Oakes, the President, and various other gentlemen who had contributed to a most interesting evening, and the proceedings terminated.

Correspondence.

THE MEDAL AWARDS AT THE RECENT EXHIBITION.

To the Editors.

Gentlemen,—In giving the medals on the 12th inst. the President said, with regard to the instantaneous photographs of Mr. Payne Jennings, "I am assured these are each printed from one negative."

The gift of a medal is matter of public interest, and I therefore think it right to call attention to the fact that the photographs in question are not printed from one negative, but have skies printed into the foregrounds from separate negatives. The assurance given to the President was, therefore, incorrect.

Not being myself an exhibitor I am free to bring this subject forward.—I am, yours, &c., H. STUART WORTLEY.

Rosslyn House, Grove End-road, London, N.W., November 19, 1878.

[It would be very desirable if Colonel Stuart Wortley would state the grounds upon which he is unable to accept the *dictum* of the President in this matter.—EDS.]

To the EDITORS.

GENTLEMEN,—As an exhibitor it might seem prejudice on my part to call in question the Society's awards of medals; but I cannot refrain from saying that I have always been led to think that a photograph, to be perfect, should not only consist in a well-chosen subject, detail, softness, freedom from blurring, &c., but that, also, the trees should show freedom from movement in the foliage, which is far from the case with the picture of the School of Military Engineering which has been awarded a medal.

It will certainly prevent many, both amateurs and professionals, from exhibiting if just awards are not made.—I am, yours, &c.,

Hoe-place, Woking, WM. WAINWRIGHT, JUN.
November 15, 1878.

THE TECHNICAL EXHIBITION OF THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—I do not think the Technical Exhibition at the Rooms of the Society of Arts could be considered a success; but then I was an exhibitor, and, perhaps, expected more applause than I received or deserved. I did not expect to have to talk about my exhibits, because I only brought them at the last moment. I thought that I might have found just sufficient favour for my wares to have been laid on the table for such as felt inclined to look at after the *business* of the evening was over, and, so far, was not disappointed.

My surprise was great when the President, in his opening address, informed us that he knew nothing of the business of the evening, but infinitely greater when I found that I was among the first called upon to address the audience (a very patient and good-tempered one, by the way). Does not this point to a lamentable want of organisation? Surely those who wish to speak or read papers might be called upon to give timely notice so that a syllabus of the business of the meeting might be in the hands of the President, and thus spare those who did not intend to speak from inflicting an unprepared address upon the audience.

I think, further, that a little of the preparations which were so well arranged for Mr. Bolas's Cantor lectures would not only have spared us the time, but the exhibitor the humiliation, of having to go and fetch jugs of water to illustrate his part of the exhibition.

The idea of a periodical Technical Exhibition is too good a one to be allowed to drop, but I venture to predict that they would be far more successful if better organised.—I am, yours, &c., ONE OF MANY.

New Inn, London, November 15, 1878.

EXCHANGE COLUMN.

I will exchange a quarter-plate Voigtlander lens for a Moulton's photo. washing machine.—Address, W. S. B., 103, Newgate-street, London.

A Dallmeyer's portrait camera, with repeating back and rackwork adjustment, and Burr's No. 3 cabinet lens, will be exchanged for a Ross' No. 7 symmetrical, or a 10 × 8 B doublet.—Address, G. HADLEY, 33, Newland, Lincoln.

ANSWERS TO CORRESPONDENTS.

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

PHOTO-MECHANICAL CORRESPONDENCE.

BETA.—It will be described in due course.

LITHO.—For general instructions in taking a negative consult an elementary treatise on photography.

J. B.—If you find it necessary to continue the rolling until the stone becomes nearly dry you must re-moisten it.

S. CORDING.—The markings which you describe probably arise from the contact of some greasy substance with the stone. Perhaps the gelatine which you employed in making your transfer-paper contained fatty matter.

GENERAL CORRESPONDENCE.

REGISTRATIONS.—In our next.

JUNIUS.—The transfer collodion is much too thin. Add at least four grains more pyroxyline to each ounce.

M. SHELLY directs our attention to a somewhat palpable error in the statement of his case which appears in the "Answers" column of our issue of the 8th inst. He is there made to say that the land for which he desired a particular design "has a north frontage to street of eighteen feet, and a depth of four feet," whereas the depth is actually *forty* feet.

W. B. M.—Warm the alcohol in a test tube by means of a spirit lamp, and having powdered the nitrate of silver add it by small pinches at a time. In this way it will be speedily dissolved.

J. R.—Messrs. Marion and Co. will be able to supply you with what is required. Willis's aniline process is still being worked in London, but we are unable to indicate any place where specimens may be seen.

YOUNG GEORGE.—The best proportions for preparing photoglyphic plates for engraving by Talbot's process consist of a quarter of an ounce of gelatine dissolved in ten ounces of water, to which is added an ounce of a saturated solution of bichromate of potash.

H. M. (Amateur).—We recommend you to omit a small portion of the bromide, and supply its place with iodide, the latter, however, being in greater quantity than the former in the proportion of 166·2 to 119·2, the former representing the iodide and the latter the bromide of potassium. Should you decide upon retaining all the bromide and adding iodide, then increase the quantity of nitrate of silver in the proportion of 170 as against the combining quantity of the iodide.

CAPT. O'BRIEN.—The following is the rule for finding the distance at which the lens must be placed from the picture:—Add one to the times of enlargement, and multiply the sum by the equivalent focus of the lens. The product is the length sought for. The other focus is found by dividing the equivalent focal length of the lens by the times of enlargement or reduction required, and adding it to the equivalent focal length. The sum is the length sought for. The relative place of the object and image will depend upon whether the model is to be enlarged or reduced.

B. D. L.—1. With regard to tone: a rule for general guidance may be deduced from the fact that citric acid in the developer produces cold blue tones, whereas with acetic acid the tones are warm.—2. A fifteen-grain solution of tannin will be quite strong enough; but it will not cause you much trouble to try both a ten-grain and a fifteen-grain solution, and to note the points of difference between the transparencies obtained by the use of each preservative. While you are about it you may as well try also the effect of a five-grain solution. Thus, by means of a few experiments, you will soon be enabled to determine which of the above will prove most suitable for the purpose for which it is desired.

GEORGE REID.—1. We have frequently made use of gelatine as well as of collodion for transferring negatives. The proportions we have found best are one ounce of gelatine to four ounces of water, about half-a-drachm of glycerine being added. Having made the negative warm, place it on a levelling-stand and pour the above solution upon the centre of the plate, making use of a glass rod, or even a slip of cardboard, to spread it uniformly over the whole surface. When quite dry give the plate a coat of spirit varnish, and then pass a knife round the edge so as to cut through the combined layers of collodion, gelatine, and varnish, which, now forming a single pellicle, may be easily removed from the glass.—2. In an under-corrected lens the chemical or actinic focus—that is to say, the focus at which a sharp photograph is obtained—is *nearer* to the lens than the surface of the ground glass upon which the image is seen to be sharply delineated.—3. From your description of the unset lens it is evidently very much *over*-corrected.

WHY, INDEED?—Why does a photographer in the excercise of his business always use a black cloth? Why, of course, to make his camera obscurer.—*Judy*.

AMATUER PHOTOGRAPHIC ASSOCIATION.—The prizes awarded at the last Council meeting, consisting of three silver goblets, two elegant albums, and six oil paintings, may now be seen at 12, York-place, Baker-street, W., where they will remain on view until the end of next week.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The annual dinner in connection with this Society was partaken of by several members and friends, on Saturday evening last, in the Café Royal, Regent-street. The Rev. F. F. Statham, M.A., President, occupied the chair, Mr. Peter Mawdsley officiating as vice-chairman. There was a good attendance, and the dinner was followed by the toasts and speeches usual on such occasions.

THE INFLUENCE OF PETROLEUM STOVES UPON CARBON TISSUE.—A short time ago we received a note from Mr. H. A. H. Daniel, in which he described his experience with a petroleum stove. He had prepared two batches of carbon tissue, and made use of a stove of that kind for drying it. Next morning the tissue was beautifully and evenly dry, but upon subsequently attempting to develope the image he found that the tissue was perfectly insoluble. As no light had access, the conclusion was forced upon him that the petroleum stove caused the insolubility. No smell existed, as the oil used was highly refined. Since we received the letter from which we have quoted we have dried a sheet of tissue in a small room in which a paraffine lamp was kept burning all the time, and as we did not find insolubility result from doing so, we should like the aid of our readers in determining the conditions under which insolubility takes place, the tissue being, of course, carefully shielded from the light.

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 969. Vol. XXV.—NOVEMBER 29, 1878.

ON THE PRODUCTION OF A UNIFORM QUALITY OF PYROXYLINE.

Of late years the difficulties which surround the preparation of pyroxyline for photographic purposes, instead of disappearing with the advance of knowledge, seem only to become greater, as if in the general progress towards perfection pyroxyline were being left behind. In one respect this is not a matter of surprise; for, if we take into consideration the great variety of purposes to which pyroxyline is applied in photography, and the widely-different conditions which have to receive attention in the manufacture of the special products—conditions which on a small or experimental scale are almost impossible of fulfilment—we cease to wonder that this branch of research should have remained comparatively neglected at the hands of those who have done so much to advance photography in other directions.

In saying this we do not wish to imply, even in the most indirect manner, that the manufacturers—that is to say, those from whom we derive our supply of this article commercially—have failed in their duty; on the contrary, we think it may be safely said that they have always evinced their desire to keep pace with the demands made upon them. But in view of the constantly-varying requirements in this direction—especially in connection with dry-plate processes—it is obviously impossible for the same individual to play the part at once of manufacturer and experimentalist. It seems equally impossible in one product to combine all the desirable qualities of half-a-dozen different samples; and hence, though we may experience little difficulty in obtaining a pyroxyline eminently suited to any one process, we find that as we vary our conditions ever so slightly difficulties crop up with which we had previously no acquaintance.

Of course, to those of our readers who are content to pursue the even tenor of their way, without troubling themselves with the little niceties of manipulation or most recent "improvements," these remarks will have little application; their sole object is the production of pictorial results, and the chemistry of photography is to them but one means to the end. There exists, however, another class whose interest in the art-science is more widespread. To these photography is both an art and a science, and their love for its pictorial phase is equalled, if not excelled, by their interest in its chemical aspect; and it is to this class we address ourselves, with a hope of stimulating research in the most (of recent years) neglected branch of photo-chemistry.

Research there has undoubtedly been; but, unfortunately, the subject is so wide in its ramifications, and presents so many different points for consideration, that it is an almost hopeless task for a single individual to undertake unless he be prepared to devote his whole attention to it for a very considerable time. None but those who have actually attempted any systematic course of experiment in this direction can fully realise the importance of the undertaking. Something over twelve months ago we ourselves embarked upon such an attempt, and, after conducting between seventy and eighty experiments under a variety of conditions and with nearly every possible material, we became convinced of the utter hopelessness of attaining the end we had in view except by devoting such an amount of time and attention to the subject as we were unable to afford. The experience then gained, however, enables us to point out some of the difficulties which present themselves to the experimentalist, and now that outdoor work is at a standstill the present seems an appropriate time to suggest that some of our chemical readers should take the matter in hand, each confining himself to one part of the subject only. By adopting such a course the personal labour would be materially reduced, and by a subsequent collation and classification of the results thus secured the general question could not fail to be reduced to a smaller compass.

The three principal conditions which affect the nature and quality of the pyroxyline are temperature, strength of acids, and their relative proportions. To these may be added—not as being of less importance, but as being generally less regarded—the nature of the raw material and the time of immersion; and we are, perhaps, not saying too much in expressing a belief that these two latter in their mutual bearing have quite as much to do with the final result as any of those previously mentioned.

We have spoken of difficulties which arise or are specially prominent when working upon a small scale; the chief of these is in connection with the temperature—the element which, *per se*, is supposed more than any other to fix its stamp upon the character of the product. It is only necessary to remind our readers of the fact that a large mass of matter, be it solid or liquid, retains its heat longer, or parts with it more slowly, than a smaller quantity would do under similar circumstances, in order to point out how in manipulating upon a small scale it is more difficult to secure an equable and fixed temperature of the acids. Thus, supposing, for example, we are working (say) half-a-gallon of mixed acids, and at the commencement of the operation the thermometer registers 165°, it is possible that the temperature during the time of immersion may not fall much below 160°; but, if the bulk of the liquid be only eight or ten ounces, it is no uncommon thing to find, after an immersion of seven or eight minutes, that the temperature has fallen as low as 130° if no precautions have been taken to keep it up. Of this, however, more anon. Here is a very evident source of uncertainty and irregularity. The evil is not confined, however, to the mere fall in temperature acting upon the whole mass of cotton. As the immersion of the cotton occupies some time the first portions put into the acids will be exposed during a part of their time to a much higher temperature than the last portions of all, and thus it may be said that each succeeding tuft plunged into the mixture is acted upon under continually-changing conditions, and where the alteration in temperature is so great as we have mentioned it is not difficult to imagine that a very uncertain product will result.

On the other hand, it is possible that a *rise* of temperature may occur, especially when from weakness of the acids, the presence of moisture in the cotton itself, or other causes there is a tendency on the part of the cotton to undergo decomposition. Under such circumstances it is palpable that the increase of temperature will be more easily imparted to the whole bulk of the mixture where the quantity is small than where the opposite is the case; in short, in working on a small scale, the conditions are strongly against uniformity in the matter of temperature. Again: in mixing small quantities of acids a lower degree of natural heat is evolved than when operating upon a greater bulk, and we have frequently found it impossible to secure a temperature of even 160° without resorting to artificial means.

In order to equalise the temperature various means have been recommended, perhaps the safest of which, when it proves sufficient, is to mix the acids in a vessel of considerable thickness—as a Wedgwood mortar — previousiy heated to the necessary point. Where this fails it is usual to recommend the employment of a sand- or water-bath; but the latter is, in our opinion, to be avoided, on account of the strong affinity of the sulphuric acid for the aqueous vapour which must necessarily arise from it. A general objection presents itself, too, to the adoption of either of these latter plans on the ground of the difficulty of regulating the temperature without very great care; and, when employing an original temperature of 170°, it is extremely inconvenient to find the thermometer suddenly run up three or four degrees before the pyroxyline can be removed. In any single experiment it is quite within the bounds of possibility that a satisfactory result may accrue in spite of all or any of these objections; but what we urge is that, in securing an invariable product, the chances are much in favour of the manufacturer as compared with the experimentalist.

As regards the proportion and strength of the acids: there is, perhaps, not much to be said in this connection, except that the latter may indirectly have an effect upon the result, inasmuch as the large consumer is more likely to know the exact strength of his materials, or to ascertain it by actual trial, than one who uses small quantities at uncertain intervals and probably derives his supplies from varying sources. We know that commercial acids rarely rank up to their alleged specific gravity, and any allowance which may have to be made in the added water will be more difficult to calculate accurately on a small than on a large scale.

We have now to turn to an element which works generally against uniformity, whether on a large or small scale of operations, namely, the want of a standard raw material. Cotton, it may be said, is cotton all the world over; but those who are acquainted with the different descriptions of the article which arrive in this country in the raw state will know that their name is "legion." Much has been said about the importance of a long-staple cotton for collodion purposes; but we question if as much depends upon the length of fibre as upon its freedom from the various greasy and mucilaginous impurities with which it is contaminated before it undergoes the earlier processes of manufacture. It is evident, too, that the cotton wool or medicated cotton generally employed in the manufacture of pyroxyline is not wholly freed from these impurities, the only process it undergoes being, apparently, the removal of seeds and particles of seed husks. The cleansed article introduced at the recent Technical Meeting of the South London Photographic Society seems to offer a way out of this difficulty, as, independent of its being more easily permeated by the mixed acids, the process to which it is submitted to give it this character is identical with the method adopted in cleansing the linen rags employed in paper-making.

Much diversity of opinion exists as to the utility or otherwise of the mode of cleansing the cotton with dilute alkali, some alleging that it has an injurious effect upon the character of the resulting pyroxyline. This charge may very possibly be well founded if the alleged injury consist in a loss of density, as the "impurity" removed may in all probability conduce to the production of that special quality. This points to another and separate line of research, namely, the effect likely to be produced by the presence of the different substances found in combination not only with cotton but with flax, hemp, and other descriptions of fibre, and also whether, starting with strictly pure cellulose, it may not be possible by the addition of various foreign substances to produce the special properties now so much desired with certainty and uniformity.

In speaking of the manufacture of pyroxyline it is impossible to pass over what has already been done in the direction we indicate by the Rev. F. Hardwich, whose researches stand to this day as the basis of all our knowledge of the article. But twenty years have worked a wonderful change in photography, and its requirements of today differ very materially from those of the date at which Mr. Hardwich wrote; and we think the time has arrived when his work might well be supplemented. Failing any single individual with time *and "pluck"* enough to undertake the task single-handed, we should be glad to find it seriously taken up by a number of independent chemists, each, as we have suggested, devoting himself to one portion of the subject.

ENLARGED NEGATIVES *V.* DIRECT ENLARGEMENTS.

In our last number, when directing attention to the applicability of the electric light to photography, especially in reference to enlarging, we mentioned that some of the best of this class of pictures we had seen were made direct from the negative without the intervention of a transparency or enlarged negative. These have been sometimes produced on plain salted or albumenised silver paper and on carbon tissue, and for this kind of enlargement the solar camera has hitherto been employed. Sometimes they have been developed silver prints on plain paper, and sometimes what are now so generally known as collodion transfers. The object of the present article is to consider the best method of producing enlargements in our everyday practice, so as to get the highest quality of result from any given negative that may have to be employed.

Speaking from a strictly theoretical point of view there can be little doubt that when the negative is as perfect as it is possible for it to be the best result should be obtained when it is employed for making the enlargement; for if a transparency has to be made there is certain to be a trifling loss of detail and delicacy whatever method may have been adopted in obtaining it. And even with all possible care and skill slight imperfections that do not exist in the original are almost certain to make their appearance, and as a matter of course are magnified in the enlarged negative, thereby marring its beauty. Although in practice this may not be very apparent, it is nevertheless true.

It is and has been for twenty years well known that for the solar camera thin, delicate negatives are required, and images of a similar character would also be necessary if the electric light were employed in its stead. Fortunately the general run of negatives made at the present time are of a character well suited for this purpose. It should also be borne in mind that a negative may be as perfect as were some of those produced a few years ago when pyrogallic acid was employed as the developer—that is, as far as its direct printing qualities are concerned; but such a negative would be quite useless for enlarging in the solar camera, even if the sun could be depended upon or the electric light were at command, and it would have to be reproduced in a thinner and more delicate manner before it could be employed. It frequently happens in business that the photographer is called upon to supply several enlargements from old, hard, and intense, or, perhaps, foggy, flat, and imperfect negatives; and, as in such cases direct enlargement cannot be employed with any degree of success, recourse must therefore be had to the method, now so generally practised by most of those who work this branch professionally, of making enlarged negatives through the medium of a transparency. By this means the operator has the power of producing an enlargement which is often technically superior to prints made from the original negative. We have frequently seen soft and delicate enlargements produced from hard and crude negatives, and also brilliant and vigorous ones from poor, feeble originals; but a little consideration will show how this may be accomplished.

Given a crude, hard negative, such as would produce prints of the "soot and whitewash" type: the first thing to be done is to make a transparency. For this purpose any of the well-known methods may be employed, such as wet collodion, gelatine, or collodio-bromide emulsion, the albumen or carbon processes. Each of these has its advocates, and as each will give good results it matters not which is employed so long as the end is gained, the point being to secure as thin and delicate a transparency as possible. This can easily be done by giving a full exposure, and so managing the development that all the detail is secured with as little intensity as possible, the result being what for other purposes would be called an over-exposed picture. If for this purpose the carbon process be employed then such a tissue should be selected as contains but little pigment, so that the shadows may be comparatively thin and transparent; in this case, also, full exposure should be given, so as to secure all the detail. From transparencies of the character we have just described enlarged negatives may by judicious treatment be produced far superior to the originals.

Now, supposing that the original negative be the reverse of what we have described—weak and poor, with, perhaps, fogging in the shadows—we must then proceed in a manner the reverse of that already indicated, and aim to produce a vigorous transparency by giving only just sufficient exposure to secure the detail and to get as much intensity as possible in the development. We need not take up space now in describing how this is to be accomplished, as it is well known to all our readers. If the carbon process be adopted, such a tissue should be selected as contains a large amount of colouring matter and gives vigorous prints. That known as the Autotype Company's "special transparency" is well adapted to the purpose, as it gives prints of great depth and vigour. If, however, sufficient intensity be not given by the tissue itself, it may be still further strengthened with a solution of permanganate of potash, by which means almost any amount of vigour may be secured.

While on this subject we may call attention to another method of enlargement which, although practised by many, is not so generally employed as it deserves to be, as the results produced by it are very fine. It was published in THE BRITISH JOURNAL OF PHOTOGRAPHY about five years since; it has also been sold as a secret process, and by the same method M. Lambert produced some of his most successful untouched enlarged *prints* when on his visit to this country. The process possesses all the advantages claimed for the direct method, inasmuch as the actual enlargement is made from the original negative; and it also has all the advantages of the system in which transparencies are utilised. It consists in making an enlarged transparency of the full size required in the enlarging camera on wet collodion. In this operation the exposure and development may be "dodged" according to the requirements of the original negative as alluded to above. The transparency when obtained can be retouched to any extent in the same manner as a negative, using a blacklead pencil for the face; also by covering the back with *papier vegetal*, and working on that with a stump and finely-powdered blacklead. By this means lights can be softened, details put in, and shadows strengthened, which it is impossible to do by working on the negative only. It will be found very easy to work on the positive, as the lights and shades are in their proper relation and not reversed as in the negative. After the transparency has been made and retouched a negative is produced from it. There are many ways of doing this, a good method being to print it on carbon tissue (the "special transparency" answering well), developing it on glass in the same manner as a carbon transparency. Should the negative prove to be too thin it may be intensified with a solution of permanganate of potash; but this after-intensification will rarely be required unless the positive has been too weak to allow the light to penetrate sufficiently deep into the tissue to secure the requisite vigour. A carbon negative can, of course, be worked upon in the same manner as a collodion negative when it is varnished; but it can also be worked upon with a stump and blacklead before varnishing, as the pigmented gelatine readily takes the blacklead, especially if it be gently breathed upon before it is applied. We commend this process to our readers as one that is specially useful when a large number of copies are required from one negative. The time expended in retouching the transparency and negative will be amply repaid in the quality of the prints produced.

RECENT PATENTS.

No. XXII.—HEMERY'S PRINTING- AND TINTING-FRAMES.

WE now redeem the promise, made last week, of giving a detailed account of the printing- and tinting-frames invented by Mr. T. G. Hemery, and which, as we have previously explained, were exhibited and the mode of action shown at the recent Technical Exhibition Meeting of the South London Photographic Society. We commence by giving the specification of the patent, which is as follows:—

My invention relates to photographic printing-frames, and has for its object to ensure accurate registration in producing by subsequent printings ornamental borders, marginal tints, signatures, combination backgrounds, or other effects supplementary to the main subject of the picture produced at the first printing, so that any desired number or combination of such effects may be produced by separate printings in one or more tinting-frames, with perfect accuracy and without the aid of special skill on the part of the operator.

My improvement consists in the employment of register pins or studs in corresponding positions on the first and second printing-frames (termed, respectively, the printing- and tinting-frames) in combination with a metal plate (which I term a register plate) having corresponding holes therein, capable of being fixed on the pins or studs of either frame, and transferred from one to the other as required, as hereafter described. The pins in the printing-frame, in combination with the holes in the plate, serve also to punch holes in the sensitised paper or tissue, whereby its proper position in the tinting-frame is ensured.

I prefer that the pins of the printer should be on the back or lid, and those of the tinter in corresponding positions on the frame itself. The printing-frame is also provided with spring catches to retain the register plate when placed in position by the closing of the lid, as hereafter described.

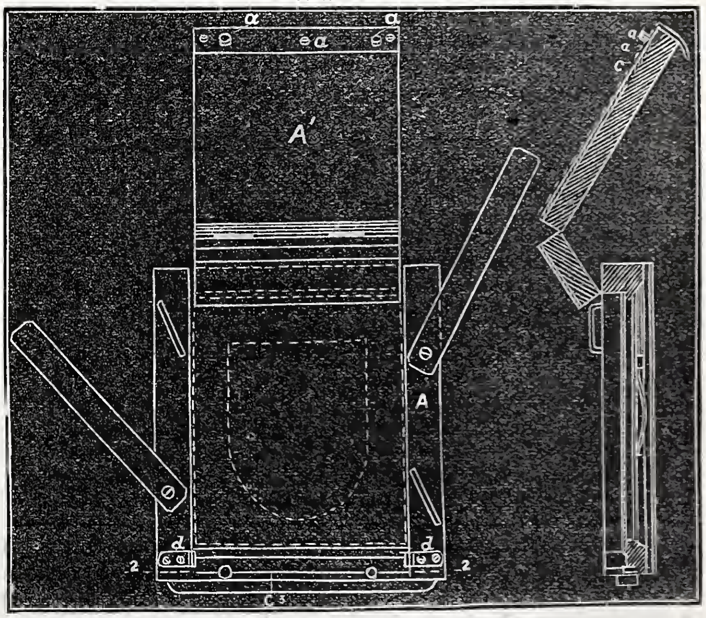
To the register plate is attached the mask for protecting the parts to be sub-printed according to the design. Any number of these register plates may be used, carrying the marks to be employed at the successive stages or printings if necessary.

To enable combination backgrounds and other supplementary effects to be printed in a single tinter, the plate carrying the skin on which such effects are mechanically printed or otherwise produced is removable from the tinting-frame, so that it may be replaced by another carrying a different design.

The pins of the printing-frame, instead of being fixed, might be movable if preferred, and attached to a spring plate which draws them out of the holes in the register plate after being pressed down to punch the register holes in the sensitised paper or tissue.

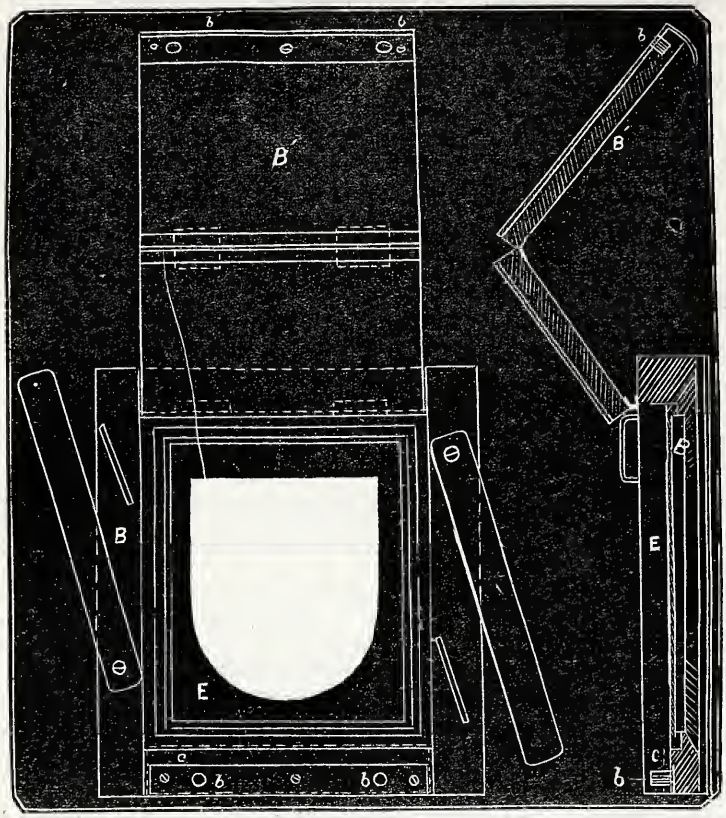
In illustration of the foregoing specification we append diagrams, by which the details will be made clear.

FIG. 1. FIG. 2.



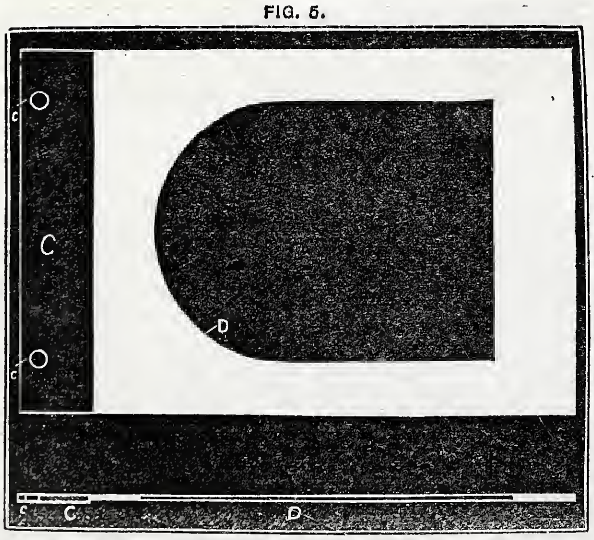
In *fig.* 1 is shown a view of the *printing*-frame when the back is thrown open, *fig.* 2 being a section of the same. *Fig.* 3 represents the tinting-frame, *fig.* 4 being a sectional view. To the hinged back or lid A^1 of the printing-frame are attached, in the position shown, two or more metal register pins or studs *a*. The studs are fixed in a metal plate a^1 screwed to the lid A^1, so as to project from the inner surface of the lid A^1, as shown. The tinting-frame has corresponding register pins or studs *b* preferably fixed to the frame B itself, and not to its lid or cover B^1, the latter having, however, a plate of metal with holes b^1 corresponding to the pins *b* fixed to it in the same position as that occupied by the plate a^1 on the lid of the printing-frame.

FIG. 3. FIG. 4.



The register plate C (*fig.* 5) is of metal and has holes *c* corresponding exactly in size and position, both with pins *a* of the printing-frame and pins *b* of the tinting-frame. The ends of the studs *a* are flat, with sharp square edges, so as in conjunction with holes *c* in plate C to punch out holes in the sensitised paper or tissue. *d*, in *figs.* 1 and 2, are spring catches attached to the sides of the

FIG. 5.



printing-frame A to detach the register plate from the pins *a*, and retain it with the mask attached thereto when placed mechanically in position by the closing of the lid. D is a paper mask attached to a register plate C, the mask shown being intended to protect the border whilst the subject is being printed, it being understood that any form and number of masks, and any number of register plates C may be used, according to the design and effects required. E is the corresponding disc on the glass plate of the tinting-frame to protect the subject, whilst the background, ornamental border, marginal tint, title, or signature is being printed.

The *modus operandi* is as follows :—It being supposed, for the sake of simplicity, that only one register plate C is used, the plate, carrying the disc E and the margin, signature, or other design to be sub-printed, having been placed in the tinter B, the proper position for the mark D to be attached to the register plate C is found by temporarily placing said plate on the pins *b* of the tinter (as shown in dotted lines at C^1, *figs.* 3 and 4), and adjusting the mask D to the disc E, the said mask D being then attached to the register plate, preferably, by india-rubber solution. The register plate, with the mask D now attached, is then removed and placed on the pins *a* of the printing-frame, as shown in dotted lines at C^2, *fig.* 2, and the cover A^1 being then closed down the register plate is caught by the spring catches *d* and retained, as represented in dotted lines C^3, *fig.* 1, in the proper position to ensure accurate register when the lid A^1 is again raised to place in the printing-frame the negative and the sensitised paper or tissue. The latter must be large enough to cover the holes in the register plate, so that on again closing down lid A^1, for the purpose of printing the subject or picture, the pins *a* will punch holes in the paper or tissue, which, when the paper or tissue is transferred to the tinting-frame B, fit on the pins *b*, whereby the correct position of the paper or tissue in the latter frame is assured.

Since the introduction of the combination printing-frames of Mr. B. J. Edwards we have not seen any that permits in such an effective manner the printing of a subject from a number of negatives. The Hemery frames possess, however, certain advantages over those named, one consisting in their greater simplicity and efficiency, there being fewer complications in their construction.

The description of work which can be executed by the agency of the Hemery frames may be acertained from the following details connected with the exhibits at the Technical Meeting to which we have alluded:—

The pictures included a portrait in carbon with the ordinary *entourage* familiar to Lambertypers; also a church with a steeple tapering to a feather point (a very difficult task, and, being successful, a very capital example), in which clouds were printed so perfectly as to render any junction imperceptible, being printed indeed close up to the subject in every part, without that suspicious haze ordinarily seen in pictures all along the line of junction, so suggestive of the use of cotton wool or even of dusters — the method usually adopted when double printing by hand is resorted to. There were also two tinted cabinet vignettes, with ornamental borders, in which *three* printings had been accomplished, the effect being excellent. There was, further, an example of printing Warwick Brookes' "academy" negatives—more accurately done than is possible by the discs provided for the purpose, and which are discarded in Mr. Hemery's frames altogether. There were also included eight *carte*-size portraits with natural backgrounds (Ford Smith's), being the portraits of two children, one position only, but each background being changed, and no two pictures were alike. It was explained that only one adjustment was necessary in the first instance, after which every portrait could receive a second printing by any ordinary assistant without the chance of a mistake on his part; that at will the background could be changed without any alteration of the adjustment, and a great variety of portraits produced, as was evident from the copies shown. The eight *cartes* were perfect examples of the power the frames give the photographer to vary his proofs, as there can be no doubt that this variety would end only with the stock he might happen to possess of background negatives. If an an entire dozen could be printed, each one being different in pictorial effect—as we are assured they can be with no more trouble than if they were simply plain backgrounds (and we see no reason to doubt the assertion from the absolute perfection of the copies exhibited)—we should think the frames would be eagerly sought after and universally adopted by the profession. The frames themselves are certainly ingenious in construction, and it would seem at a glance that perfect accuracy of registration must be ensured.

This combination printing-frame will prove of great use to those photographers who desire to leave the well-worn track of simple printing from single negatives; and, from what has been said, each will easily discover to what extent and in what degree its adoption will prove beneficial in his own practice.

WHAT is the reason that spots and blemishes are more frequent in the sky of a negative than in other parts? This question has been so frequently asked and so frequently answered in a variety of ways that it seems somewhat surprising that it should crop up again (in an indirect manner certainly) with a certain amount of doubt attaching to its cause. Mr. William Washam speaks, in our last number, of a defect which he has recently experienced in connection with certain films he has been using, and which takes the form of a peculiar mottling, most noticeable in the sky portion of the negative. This he attributes to the formation of some "by-product" at the underside of the film, which is only imperfectly removed by the washing which the plate undergoes before drying. This appears a scarcely feasible explanation; for, in the event of an imperfect washing, the evil would surely be spread uniformly over the whole surface and not merely in detached spots. It is extremely unlikely that a film containing (besides the unevaporated solvents) the decomposition salts formed in the operation of sensitising would become impermeable to water; *after once washing* and drying it might do so, but so long as the nitrates remain in the pores of the film the water will always find ready access; but let the pores be freed from crystallisable or soluble matter and closed by drying, *then* impermeability may ensue. From Mr. Washam's description of the facts we see no reason to doubt that the mottling arises from purely physical causes. That it should be visible after fixing only when the development by alkali is pushed to the fullest extent is easily explained. The development commences from the surface, and in a given time acts through a certain thickness of the sensitive matter, and, if not continued sufficiently long to reduce the whole of the bromide in the thicker or mottled parts, the unreduced portion is removed from *the underside* of the film by the fixing solution, and the mottling disappears. If, however, the development be continued long enough to go through the thickened parts the heavier deposit of reduced silver tells its tale. That the defect should make its first appearance in the sky, and should be more generally visible there, is equally easy of explanation. The sky receives relatively a better exposure than the rest of the picture. Over-exposure is, in effect, equivalent to a strong or a prolonged development; hence a development which is insufficient to render the defect visible after fixing in the remainder of the picture may easily produce it in the sky. The reason, however, why the sky is "most affected" is simply because the defect is *more noticeable* in the sky than amongst the broken details of the rest of the picture; and we apprehend that a close examination will lead to its detection in *any part of the picture* presenting a smooth, unbroken deposit of moderate density.

ON COMBINATION PRINTING FOR THE STEREOSCOPE: CONCERNING THE APPARATUS.

[A communication to the Manchester Photographic Society.]

Our Secretary, Mr. W. J. Chadwick, induced me to promise you a second instalment of my paper for the present meeting—a promise, I must confess, I somewhat reluctantly gave, as I would fain have had a little time longer, so that I might have an opportunity of producing some half-dozen transparencies from negatives of my own taking illustrating the peculiarities of Mr. Breese's mode of procedure; but this must be postponed till a future meeting.

I am somewhat at a loss to know where to begin, Mr. Harmer having, in some measure, forestalled me in a great deal of the information I had to give you; but I will supplement as well as I can the very sensible paper he wrote on the subject a few months ago, and I am only too glad I have unearthed a rival in the field, for, between us, I trust the subject will receive the attention it deserves.

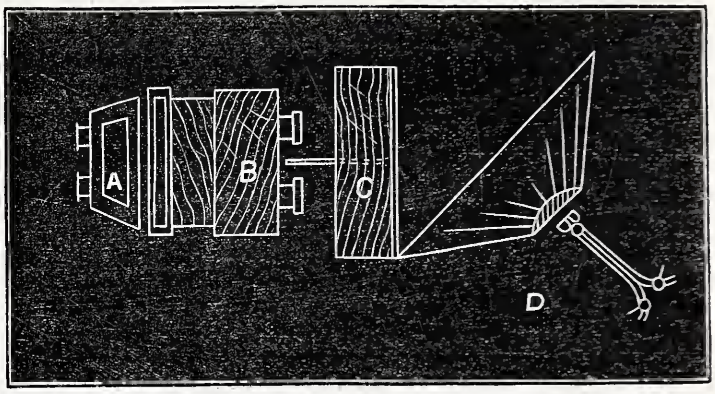
I shall begin by describing what I consider to be the best form of apparatus to meet the wants of those who print transparencies commercially, and, as I am writing with a view of inducing amateurs as well as professionals to take an interest in this matter, I may mention, *en passant*, that the printing of stereoscopic transparencies and lantern slides may very suitably go hand in hand, the same apparatus answering the purpose admirably. Two lantern slides may be printed at each exposure on a small stereoscopic plate with a quarter of an inch to spare, the only difference being that the lenses have to be slightly separated from one another for the latter, and, of course, making such difference in the mode of development as suits that class of picture; for, as you know, lantern slides do not require to be anything like so dense as transparencies for the stereoscope.

Later on I intend to describe for the benefit of those who have more ingenuity than spare cash a form of apparatus that may be made at a very trifling cost; for I am sure there are many who would like to try their hands at this kind of work who are frightened to begin, thinking their means inadequate or that it will take up too much of their time. These difficulties I have set myself the task of clearing away.

Mr. Harmer, in his first communication on the subject, describes the apparatus as follows, and as I do not know that I can improve upon it as a *general* description I will quote it *verbatim*; but, as I know only too well the inconveniences of printing, even with Mr. Breese's own apparatus, and as I have witnessed only too often the sad waste of time in adjusting each subject, I shall venture to enlarge upon the description given by Mr. Harmer, with improvements suggested by my own experience. Mr. Harmer says:—

"The principal pieces of apparatus necessary are a binocular copying camera, and a good tin or other simple form of lenticular stereoscope open at the bottom. The camera should be fitted with twin lenses, and the usual partition to divide the two pictures both in the portion of the camera before the lenses and also that behind. The front carrying lenses must have, besides the rising motion, a means for varying the distance between the lenses, to bring them nearer together or remove them further apart, as circumstances may require. A right- and left-handed screw motion worked by a milled head from the side is most convenient; but rackwork, or any other contrivance which will do that, fully answers the purpose.

"The camera retained for Mr. Breese, by his desire, was supplied by Mr. J. H. Dallmeyer, and fitted with a pair of that gentleman's new stereoscopic lenses, the means for separating them being the right- and left-handed screw movement—suggested, I believe, by Professor Emerson, of Troy University, during the controversy on how far the two lenses of a binocular camera should be asunder. An extra home-made sliding body was fitted to the camera, and a suitable box divided into the two partitions necessary, with an opening in front for the negative and two at the back for the lenses to enter."



A is a stereoscope as used in "combination" effects, such as in moon, gull, and cloud pictures. B is an ordinary stereoscopic sliding-bodied camera, with suitable lenses. C is a box in front of the camera, with central partition holding the negative and its carrier in the front portion. D is a condenser collecting the rays from a limelight jet shown at E, and distributing the same on a semi-transparent screen used in place of the daylight reflector.

By examining the diagram you will see in front of the copying camera the usual box holding the negative to be printed from. This box may or may not be a fixture to a base-board, according to fancy; but, supposing it to be a fixture, which I myself prefer, the slide holding the carrier for the negative should be made so as to be capable of being slightly moved laterally and vertically according to requirement, and it should also have the means of being rigidly fixed when once *in situ*. This you will readily recognise as an important matter in all copying apparatus; but it is particularly important in the apparatus I am describing, and no end of trouble and vexation may be saved by due attention to the matter. The necessary adjustments for each fresh subject take some little time and judgment, but when once a satisfactory result is obtained and all the adjustments made secure, fifty or a hundred, or, in fact, as many pictures as are required may be printed straight away without any further trouble.

All Mr. Breese's negatives were taken on $6\frac{3}{4} \times 3\frac{1}{4}$ plates. This he confessed to have been a great error on his part. No stereoscopic negatives should be taken on less than $7\frac{1}{4} \times 4\frac{1}{2}$ plates, and the copying apparatus should, of course, correspond, though for merely copying purposes the camera itself need not be capable of taking a larger plate than the usual size of a transparency. The little bit of "play," however, one gets on the larger plate is simply invaluable, and the trouble of taking it is precisely the same as taking a $6\frac{3}{4} \times 3\frac{1}{4}$; whereas the slight extra weight in apparatus is of no consequence, as I have before remarked, in these days of cameras of extreme portability, and of dry plates as sensitive and as much to be relied on as wet ones.

While on the subject of negatives and the advantages of dry plates, I should like to suggest that, where possible in outdoor work, it is always worth while to expose two plates—one for the landscape alone, and one for the sky and clouds, taken immediately one after the other.

We will suppose the operator to have focussed his subject, and has in his hand a double dark slide containing two dry plates. He exposes one plate at the first favourable opportunity for the landscape—say four seconds—then quickly whips out his dark slide, reverses it, and exposes for the sky.

A friend of mine once showed me a complicated arrangement he seemed very delighted with, by which there is a sort of flap constructed in the camera, to which flap the operator has to attach a piece of paper cut out approximately to the outline of the landscape. This flap is used to mask the sky while the landscape is being duly exposed.

I confess I have not tried this plan, and I do not think I am ever likely to do so. Surely the plan I suggest is both more practicable and satisfactory in its results. I do not say it has not been done; but it is only lately, when dry plates are comparatively perfect to what they used to be, that the thing is possible. The only way to do this with wet plates is to have a plate double the size of the usual stereoscopic negative, with a shifting arrangement such as is used in the studio portrait cameras. Mr. L. Warnerke's band of sensitive tissue and roller slide would be a convenient form of apparatus for this purpose.

In printing from stereoscopic negatives the picture is not only inverted by the lenses, but the outer edges are transposed and overlap more or less in the middle of the transparency. Now, we have all at times defects in our negatives, especially in outdoor work, done very likely under difficulties, and we know that these defects take place more often than not on the outer edges of the plate. This being the case, in dealing with a small stereoscopic negative having defects on one or both of the outer edges, the said negative is perhaps rendered perfectly useless unless enlarged. This it is never advisable to do, on account of a loss in sharpness; whereas, with the negative taken on the larger scale the defects must be very serious indeed to interfere in the printing of a successful transparency. Besides this, the larger negative will bear reduction, which must contribute to sharpness; and, as I have said elsewhere, sharpness is unquestionably a desirable quality in stereoscopic work, whatever disadvantage it may sometimes possess in an artistic sense in portraiture, for the transparency, be it remembered, has to undergo considerable enlargement when viewed in the stereoscope.

In front of the box holding the negative Mr. Breese used a plaster of Paris slab, tinted of a slightly lavender hue to correct any yellowish tendency the plaster might possess. The advantage in using plaster of Paris over any other kind of reflector is that when soiled it may be easily sand-papered clean in a few moments, but there are of course good substitutes for this kind of reflector. For my own part I would as soon have a piece of looking-glass at an angle of 45° with the light falling upon it filtered through a piece of finely-ground glass or *papier mineral;* but nothing can beat printing against a clear north sky, as there must be a serious loss of light in using a reflector of any kind.

Mr. Breese, however, being very conservative in his ideas, preferred his own plan; for I remember him six years ago printing out in the back garden of his house in Sydenham in this way when he might easily have tilted his base-board and the apparatus attached thereto, so as to get the advantage of the open sky, had he chosen.

I am the more surprised at this as the tone got by printing against a good direct light is unquestionably warmer and better than when printing in any other manner, and the way Mr. Breese himself secured the extremely warm tones for his sunset pictures was by pointing his apparatus direct to the sun instantaneously, and using an old developer rather weak and stopping the development at the right time. This is the difficulty, for if the development be not stopped at the very instant the required tone is reached the colour changes to a cold grey.

There is one slide in particular that I have at this moment in my mind's eye, and that is the one I shall now hand round for you to look at. It is a sunset effect over the sea. I do not know what Mr. Breese called it; but it is the nearest approach to photography in colour that has ever been done—at least as far as my experience goes—and this slide has been entirely the production of photography. Some of his later slides which I have by me were "dodged" to secure this and similar effects. A piece of fine ground glass was used at the back instead of glass obscured with his wax solution, which he employed generally, and the ground glass had burnt sienna rubbed delicately over where a warm tint was wanted, or some cobalt oil colour or indigo when a cold tint was required.

The front glass in the slide I am handing round contains, of course, the sea view and sky and clouds. The back glass is nothing but a gradation beginning from the centre with a beautiful golden tint and fading gradually away into cold gloom. The masked negative from the spot occupied by the sun to the edges of the plate is secured, according to Mr. Harmer, by means of a star-shaped disc set revolving, and then photographed with a stereoscopic camera while in motion. This is no doubt the original way, but Mr. Breese, having no masked negatives by him of the kind he required when printing this very slide for me, had to make one, and the way he did it was by attaching two small india-rubber balls in the centres of each half of a stereoscopic plate, having previously whitened the ball on the side exposed to the camera. This he pointed directly to the sun, exposed instantaneously, and developed with some very weak developer brown with age that we kept by us for this and kindred purposes. The result you see before you.

I should have mentioned that the stereoscopic plate on which the india-rubber balls were fixed was of the finest ground glass; and you will observe that, instead of having to make a photographic negative, Mr. Breese constructed a negative without going through the usual process, the two india-rubber balls, fixed on the ground-glass plate, doing duty for the negative itself. Of course, having once got a good gradation by this means, a negative could easily be printed from it for future use.

The carrier holding the negative in front of the box C may be described as a thin loose board in which an aperture is cut a little smaller than the negative to be copied; and this carrier is kept in the position required by means of a screw and washer, the screw passing through a hole sufficiently large to allow of horizontal, vertical, and oblique movement. The object of this latter movement is to save cutting a valuable negative in the event of the line of the horizon being out of the horizontal, as is sometimes the case when negatives are taken under circumstances that leave little time for paying strict attention to the adjustment of the camera, such as instantaneous photographs of breaking waves, &c.

By referring to the diagram you will observe I have substituted an arrangement by which artificial light takes the place of daylight, so that the work may be carried on during the dark days of winter or by night, independently of the light of the sun—a great convenience to the amateur, who is often engaged during the daytime, and therefore whose only opportunity of pursuing his hobby is after business hours. To the professional it will be found of great convenience (especially in this part of the country, where daylight is not to be depended upon), as stereoscopic and lantern work may be turned to profitable account when other work falls slack, as it invariably does at this time of year.

The condenser must be so placed as to be as much out of sight of the negative as possible, and a piece of finely-ground glass must take the place of the plaster-of-Paris slab on which the disc of light falls. By every other arrangement of the light that I have tried—and I think I have tried all—I find that the sensitive plate prints quicker opposite the flame, in spite of the condenser.

The only other way I can suggest is to project a disc of the brightest possible light one can get—using two lanterns if necessary—on to a perfectly white surface, and print against that. One of these plans, unless we can think of something better, we shall put to the test when I fulfil my promise of printing a combination picture in your presence, and Mr. Chadwick has kindly consented to give me his valuable services and experience on that occasion. So I have very little doubt we shall not fail on the score of finding a good light to print by. S. H. Ashley Oakes.

BEECHEY EMULSION PLATES.

I read Mr. Washam's communication in last week's Journal with interest, as I have had some little experience with Beechey plates, and encountered the difficulties he mentions. Seeing the general interest taken in the process I presume that any experience, however small, tending towards their removal will be acceptable to those of your readers who are working it.

About two years ago I prepared several batches of the plates, but gave up in despair, the negatives being hard and completely ruined by flocculence. The process, however, had a fascination for me, and last spring I returned to the charge, but with as little success as previously. Flocculence of the film (generally miscalled "mottling," I believe) and small black spots were my chief troubles, and from what has from time to time appeared in the Journal I gather I have not been the only victim. Some commercial plates, too, that I tried were anything but free from these defects. The following method has given in my hands complete freedom from these faults, and I imagine that others would find it equally successful:—

The collodion being prepared, in any required quantity, according to the formula, pour *half of it* into a stoppered (or well-corked) bottle capable of holding three times the quantity of the finished emulsion. Now thoroughly dissolve the silver in alcohol in the usual way, and add it to the collodion in *eight* or *ten doses*, shaking violently between each addition; then pour in the remaining half of the collodion, shaking violently as before, and let it rest for twenty-four hours. If the pyroxyline be of good quality a perfectly smooth and creamy emulsion ought to be the result. I have found it unnecessary to use other than methylated solvents.

I was much troubled at one time with black spots—some with tails, some without—which appeared on some of the plates of a batch but not on others. Canon Beechey, in reply to some questions on the process, assured me that they arose from dust; but I imagine they are silver chloride, arising from free silver remaining upon the plates after washing, and which combine with the chloride in the beer. Washing the plate under the tap before placing it in the preservative secures absolute freedom from these unpleasant visitors. Clots in the film are caused by returning the surplus emulsion from the plate into the coating-bottle. The use of a second bottle obviates this difficulty, and is a security against dust.

The defects alluded to I regard as technical; but want of rapidity and hardness are the worst faults to be contended against. They are best overcome by the addition of a few grains more silver than recommended in the formula, with an increase of acid in the chloro-bromide solution if found necessary; but it is well to bear in mind that too great an excess of silver gives thin images, rather inclined to fog and difficult to intensify. Although I have discontinued working with Beechey plates, in favour of those prepared by the old collodio-bromide formula, I regard the former process as capable of giving very good results; and I take this opportunity of acknowledging my indebtedness to Canon Beechey for several valuable suggestions. H. Manfield.

PHOTOGRAPHIC NOTES FROM TRAVELS IN RUSSIA, WITH EXHIBITION OF VARIOUS WORKS, APPARATUS, AND MATERIAL.

[A communication to the Photographic Society of Great Britain.]

Six winter months I spent in Russia, and now I intend to communicate to you a few notes regarding my travels. Before, however, I proceed any further, permit me to assure you that I had nothing to do either with Plevna or with the treaty of San Stephano. My notes are purely photographic, and therefore I hope I shall not encroach either on British interests or on the rules of this Society. It was my good fortune that although I arrived a perfect stranger in St. Petersburg I very soon made very valuable acquaintances among persons connected with science and photography; and, thanks to friendly relations that followed our first acquaintance, I have been able to see a great deal, to learn much, and to bring over with me a rich and numerous collection, a part of which is exhibited in this room.

You will not be surprised to hear that photography in Russia is very well represented. In certain branches it occupies a foremost position; and there is sufficient originality to authorise me in stating that there is in the collection before you a great deal that is quite novel and deserving of more than a passing glance.

Most remarkably cultivated is undoubtedly the portraiture, and in this branch very high excellence is attained. Many causes have contributed to this perfection; but most prominent is the artistical culture of the photographers, many of the best-known names having attained a high degree of proficiency as painters before they embraced the new art. At the time of my arrival at St. Petersburg there was no photographic society and no special publication devoted to photography; but several gentlemen belonging to various scientific bodies occasionally touched upon photographic problems, and made them objects of special investigation. For want of time it will be impossible for me to enter at present into the details of these investigations. I simply enumerate the names of authors and subjects of study, intending in some other place to give a full account:—

W. Lermantoff, professor, attached to the St. Petersburg University, investigated the theory of the formation of the photographic image obtained by development, and explained it by galvanoplastic action. Interesting is the experiment in support of his theory. A small funnel made in parchment is filled with a negative silver bath, and inserted in the ordinary iron developer. Silver wire in the shape of a horseshoe is then inserted in such a manner that one end of it is dipped in silver and the other in iron. After some time crystals of metallic silver are formed on the end dipped in the liquid contained in the funnel.

N. Egoroff, professor, of the same University, studied the action of the electrical photometer, based on the principle discovered by E. Becquerel, that if two silver plates covered with iodide of silver be dipped in a weak solution of sulphuric acid—one kept in the dark and the other exposed to a beam of light—the galvanic current will be formed, the intensity of which is proportionate to the intensity of light.

E. Kotelnikoff explained the theory of the formation of the photographic image (negative) by phosphorescence, asserting that iodide of silver by a short action of light in the camera became phosphorescent with ultra violet light, and this light ultimately produced precipitation of silver in the mixture of silver and iron salts when the developer is applied.

H. Wild introduced in the physical Observatory in St. Petersburg quite an original instrument, named "uranphotometer," to determine daily the intensity of the diffused light of the sky, based on the theory of polarisation.

I have in my possession the publications mentioned, and anybody wishing to make nearer acquaintance with them is quite welcome.

During my stay in Russia I had the pleasure of witnessing the organisation of a new photographic society. Existing laws of the country put many difficulties in the way of the formation of any society; but fortunately in Russia there exists at present a very influential and powerful institution, named the "Imperial Technical Society." I shall not be very far off from the truth if I compare it to the Society of Arts combined with the Kensington Museum. This society, through its enlightened and highly-esteemed president, P. Kotchoubey, and Secretary, T. Lwoff, offered to the new applicants to accept them as a section of the Technical Society. This arrangement obtained high sanction, and the new photographic society is at present on the way to probable success. The President elected is Lieutenant-General Birkin; Vice-President, General Tchagin; Secretary, W. Sreznewski; Committee, Lewitzki, Denier, Klassen, Lapteff, Shpakowsky, Lorens. It was not decided whether the new society would issue a journal, but Professor Wagner, a distinguished editor of a magazine, *Swet* (Light), recently issued monthly supplements under the title *Swetopis* (Photography), the few first numbers of which I now forward to the library of this Society.

Since January last appeared also a new semi-weekly magazine, *Obzor Graphitzeskich Iskustw* (Review of the Graphical Arts), giving considerable room to photography, and even adorned with specimens of this art.

Photography is largely adopted by many Government establishments for the reproduction of maps and of state papers. Perhaps the largest institution of this kind in the world is the well-appointed photographic establishment under the superintendence of G. Scamoni, who is so well known in the photographic world. Every branch of photography is worked successfully in this establishment, as you can observe by the specimens kindly given to me by Mr. Scamoni and exhibited on the screens. But most original and characteristic are those *heliogravures* produced by the process described in his book, and presenting the same excellence as the world-famed *heliogravures* published by Goupil et Cie. in Paris. Mr. Scamoni's assistant, Mr. Chesterman, is an Englishman. I cannot leave the establishment without taking note of how closely allied with photography is the art of galvanoplasty. In this establishment iron is electro-deposited to any thickness, and by this means letterpress blocks are produced that are able to give millions of impressions without being worn out—a requisite for the impression of rouble notes so largely circulated in the country. I exhibit a fine specimen of an electro-deposited iron plate presented to me by Mr. Scamoni. By the same process old armour, of which excellent specimens are now being exhibited in Paris, are reproduced quite equal to the original.

Another very important Government photographic establishment is in the Depôt of the General Staff, under the able and enlightened direction of Mr. Laptef, chief of the Depôt of Maps. General Shtupendorff is himself an accomplished photographer also, and this contributes to the general success of this very busy and well-organised institution. Photolithography is his principal business. This huge map of the Austro-Prusso-Russian frontier, published for the present war, is certainly a very remarkable specimen of photolithography. However, the most remarkable production of Mr. Laptef is illustrated by this incomparable map, printed from a copper plate, and produced by electro-deposition on gelatine relief. Numerous specimens, not only of prints, but also of negatives used in this establishment, will enable you to estimate fully the excellence and importance of the establishment.

Photography is called in aid by two profusely-illustrated periodicals in the shape of photozincography, which is used for the reproduction of woodcuts published in other countries (copyright in Russia has no effect), but those are generally very inferior.

Among the private establishments that print from gelatine (Alberttype) the most remarkable is that of W. Reinhardt's. Among numerous specimens done by this gentleman I point your special attention to this rare manuscript, produced by the joint labour of himself and Mr. Sreznewsky, who, being an amateur photographer and a learned searcher after vestiges of old civilisation in his country, took all negatives from this unique manuscript, whilst Mr. Reinhardt printed them by photolithography, producing, according to his system, the transfers by Albertype. Here are autographs of Peter the Great and Catharine II., and the first book in the Slavonic language, printed in Cracow.

I have not many specimens of portraits in my collection. These you have often opportunity to see at our own and other exhibitions; but I wish to point your special attention to the production of Mr. Denier. This gentleman employs quite an original system of his own. His work, as you can judge by these specimens, is recognised among all others by its extreme delicacy, comparable to ivory or opal. Strictly, no retouching, either on the negative or on the prints, is introduced. His studio is remarkable for noble proportions, and by the total absence of blinds or curtains. He uses collodion especially prepared by himself, and gives very short exposures.

Mr. Lewitzky, whose universal reputation was established long ago in Paris and St. Petersburg, is not sleeping on his laurels. In his studio special attention is paid to every novelty that appears in photography, and you can find there that every new appliance and every process is investigated. He is the only licensee of Lambert and the Autotype Company in Russia, and his productions are worthy of close examination. I only regret that they are not more numerous.

Many other very remarkable portrait photographers are well known in St. Petersburg, such as Lorens, Bergamasco (the last most successful commercially), and others; but it happens that my collection is lacking in their works.

Next we approach the very numerous studies of Russian life in endless variety. Only attentive perusal of this very extensive series will initiate the inquiring examiner in the outside appearance and general character of the country and its people. The author of this marvellously well-executed collection is an Englishman, Mr. Carrick, who, when presenting to me his magnificent gift, imposed only one obligation—that whenever I showed any one the result of his labour and artistic genius I must couple with his the name of the late Mr. MacGregor, who was his assistant, and became his instructor and best friend till his lamented death, which occurred several years ago. Almost every photograph is a picture of great artistic value.

The fine views of St. Petersburg and Peterhoff are the work of Mr. Felish, who makes street views his speciality, and, by systematic work, has attained the excellence you can here admire without being tired by their great number. The interior of the prison acquired special interest in consequence of the last attempt on the life of the Governor Trepoff. The unsurpassed series of the interiors of the imperial palaces is the work of Mr. Classen. This is undoubtedly the finest result ever produced; but the reason of this excellence is not difficult to understand, since he possesses artistic and technical qualifications coupled with real love of the art and extensive practice. Mr. Classen, like Mr. Denier, does not use blinds or curtains in his studio. The extraordinary panorama of St. Petersburg is also his work.

The next series is the work of Mr. Karelin. You have heard a great deal of discussion respecting these pictures from the time of the last Edinburgh exhibition. I was so struck by them that, without necessity, I went to Nigny Novgorod to pay a visit to this gentleman. The trouble of the long journey was repaid by the cordial reception I received in Mr. Karelin's house, and by the pleasure of seeing a large number of far more important works than these. Unfortunately some very fine specimens have not yet arrived. Mr. Karelin has discovered means to introduce an alteration in portrait lenses which enables him to obtain extraordinary depth of focus without any loss of rapidity. This you can especially observe in the groups I point out to you. But what strikes every observer is that a great many of these photographs are illuminated by direct sunlight, and notwithstanding this they are models of softness. These groups are taken inside the room. I recollect all the fixtures of this rather low and not very light room. I mention this peculiarity for the information of some persons who suppose that these are combination prints. I have also examined the negatives.

Mr. Boldyreff, whose photographs hang on this side, says that he hit upon the same idea as Mr. Karelin. Certainly, some of his pictures approach in beauty those of Mr. Karelin. Quite recently also I received information from a friend in St. Petersburg who has also done the same.

It is possible that we shall soon be obliged to alter our photographic outfit for landscape work, and only be satisfied with instantaneous work. This apparatus is the work of an amateur professor in Moscow, Uzutzewsky. It contains a dozen sensitive plates, which are exposed without the aid of a dark slide. It also reminds one of Jonté's camera, but it is much simpler and has other advantages. The same gentleman has invented a very clever portable stand for the camera, which I hope to be able to show on some other occasion.

The indefatigable secretary of the new society, Mr. Sreznewski, has also constructed a very ingenious box tent.

I introduce next to you a very good apparatus, made in Moscow, to verify the correctness of the position of the ground glass in the camera.

Among *matériel* useful in photography I can only show you at present, in consequence of the shortness of time, this cotton, which is very suitable for making pyroxyline. It is prepared as a substitute for lint, and was used in the late war. Its peculiar property is its permeability by water—a quality very desirable in the manufacture of pyroxyline. The process employed to obtain this quality is not well known, but I heard from a good authority that it is the treatment of the cotton by steam at a very high temperature and under heavy pressure.

I close my notes by publicly expressing my gratitude to those gentlemen who, by their generosity, have enabled me tonight to illustrate my paper by these numerous collections.

Leon Warnerke.

ON THINGS IN GENERAL.

I was standing by the side of my camera the other day, when, upon laying upon it a photographic periodical I was reading, my attention was attracted by what appeared a remarkable phenomenon. Now, cameras have not usually a large range of facial expression, nor have I found them give way to undue levity; but on this particular occasion my Camera solemnly opened his Cyclopean eye and closed it again*—in fact, the nearest approach to a wink of which its features were capable. I almost expected to find it speak, with a suggestion of perambulation. Turning at once to the paper to see what might have caused this unusual behaviour, I read as follows:—"A letter was read from Dr. Richard, of Mannedorf, in which he offers to give instructions in his rapid process at a reduced price. He expressed his willingness to make it known for the sum of seventy-five francs per head, provided ten customers applied together, in order that it might be brought within the means of all; otherwise for a single customer the price would be 300 francs. At the same time he sent a plate with two pictures taken by his process; the first in one, the second in two, seconds, but marked by extraordinary softness."

Excellent Dr. Richard! and his praiseworthy desire to benefit his brethren cannot be too warmly praised! It is true that no evidence appeared to be offered as to the comparative methods of the process, and some members of the society affirmed they could do as well in a good light. But what of that? Some people are *so* particular!

One of the best things I have heard for some time happened in a large town considerably north of London. A young man of prepossessing appearance called a few months ago upon sundry photographers and asked them for specimens to send to the Paris Exhibition. With lamblike innocence they selected a few good impressions and gave them to him, and likewise took a portrait of the young man himself. They heard no more till a few weeks ago, when he walked in, at least into one of his victims' studios, and announced that the proprietors had obtained a diploma. Again were they confiding, and did not attempt to hide from their friends with any great care the news of their newly-acquired honour. I never before thought that human nature was so gullible.

I don't think it was any undue gullibility of nature that caused a drop of fifty-eight pounds six shillings in the present value of the assets of the Edinburgh Photographic Society, owing to the Glasgow bank failure. I was very sorry to see it, and hope they may get some of it back. But the society is certainly to be complimented upon the flourishing state of its funds. How many other societies, I wonder, are there of the same size that could lose between fifty and a hundred pounds and still have a balance on the right side?

What a dreadfully-painful event was that of the death of young Wrench the other day, and from an entirely preventable cause, too! Surely a manufacturer of apparatus in connection with magic lanterns should have known how to make a safe retort! But, no! One was used

* We presume our correspondent trod upon the ball attached to his pneumatic shutter.—Eds.

of the very construction adapted to cause a terrible accident if by any chance the exit got stopped up, as it may so easily do, by falling over as it did in this case, or by the lodging of portions of the materials in the neck through undue heating. It is the old story, though, everywhere—the difficulty in getting workmen to carry out new ideas. They possess a conservatism almost Chinese in its character. It is with the utmost difficulty that they can be got to make anything differing from what they or their fathers before them have made without being asked to change it. Nevertheless, for a death through accident to happen now-a-days in the making of oxygen is well-nigh criminal, I consider. I don't of course refer to those accidents that occur through the ignorance of gas users, *i.e.*, the amateur exhibitors. It was only a few days ago I read an account of such an accident happening, the windows and doors being blown out, a fifty-six-pound weight pitched to the other end of the room, and the wall injured by several heads being violently knocked against it. No one was killed, or very seriously injured. A workman had filled a gas bag with coal gas, and thought a bit of oxygen that was in didn't matter!

I see from the correspondence columns that Mr. S. Fry is telling Mr. J. Werge he has found a "mare's nest." Possibly; yet I must say that I quite thought, in reading Mr. Fry's paper, that he was describing a studio of his own design—a very good one for single figures—but rather, indeed I should think very, imperfect if a group of three or four figures had to be taken in it, especially if one were a squalling babe.

I wonder what sort of albumenised paper it is which, according to Mr. Kirkby's paper, read before the Liverpool Amateur Photographic Association, gives only two and a-half grains chloride to the sheet, and yet produces twelve or thirteen grains of sulphide from the hypo. It must be a very highly-salted paper, with most of the silver washed off after sensitising; for, taking the silver bath at thirty grains, the collodion would only represent about two-thirds of a drachm of solution—a quantity quite insufficient to cover a sheet. FREE LANCE.

PHOTOGRAPHING IN CYPRUS.

WE have already stated that Mr. John Thomson, F.R.G.S., gave, at the last meeting of the Photographic Society of Great Britain, an account of his tour. This we reproduce from the official organ of the Society:—His object in visiting Cyprus, he observed, was twofold—first, to obtain a series of photographs which would convey some idea of the place and the people; and, secondly, to procure such information as would be valuable towards the same end. He took the overland route from Paris to Marseilles and from Marseilles to Alexandria, his only difficulty being with the quantity of baggage he had with him—an item which he advised everyone who contemplated journeying to Cyprus to reduce to as small dimensions as possible. On approaching Larnaca the view struck him as one of the finest in that part of the East. The whole coast of Cyprus could be distinctly seen in the foreground, while in the distance beyond were mountain ranges, which, on looking at with a photographic eye, he could not help thinking denoted much trouble in store. Over these mountain ranges was hanging a haze caused by the heat, and this haze was not at all easy to overcome, so as to give a true idea of the landscape. This heat and haze prevailed in Cyprus during the summer months, and increased as the rainy season approached. The latter season has not yet come on, although it had been expected for some time. The beauty of the view somewhat disappeared on getting nearer to Larnaca, where the visitor saw nothing before him but a Turkish town like many others in Asia Minor or the Levant.

Larnaca is a collection of dilapidated houses, relieved by spires, towers, and minarets, and at first sight the appearance was dreary and depressing in the extreme. There was scarcely any landing places, and altogether the town was just what might be expected after some three or four hundred years of Turkish neglect and misgovernment. Larnaca was certainly not inviting with its tumble-down houses and its dilapidated, groggy-looking piers standing up in the water—very fine indeed for pictorial purposes, but not of much use for anything else.

There was but one English hotel in Cyprus, and, making his way thither, Mr. Thomson found there a number of disconsolate Englishmen, whose only occupation apparently consisted in asking each other after their health, whether they had had fever, whether they liked the place, how long they were going to stay, when they were going back, why they had come to such a place, and altogether the reception was rather dispiriting. As he had not quite got rid of the effects of the sea, he was at first half-inclined to return at once; however, he did not do this, and afterwards found that his first impressions had to be considerably modified. Larnaca was but one place, and he fancied that a good many of the impressions which had been brought to England were only derived from thence. The difficulties of photography in Cyprus were very great; there were no roads to speak of in the island. The only roads, in fact, were one which crossed the island to Nicosia in the centre, and then extended to the mountain ranges at Kyrenia, and one from Larnaca to Famagusta; all others were simply footpaths.

There was but one omnibus in the island, and Mr. Thomson had thought of travelling by it to Nicosia, but afterwards found that it was very small, and did not take baggage. The mode of travelling was by mules, camels, or donkeys, and he decided to hire mules for the purpose. The baggage mule was a very small animal, and when the apparatus was piled on to his back he was almost invisible. The muleteer was a very tall man; indeed, the Cypriotes were, as a whole, a splendid set of fellows, the majority being six feet high. When the mule was packed he deposited himself on the top of the baggage.

Mr. Thomson's apparatus consisted of one of Rouch's tents, as small a quantity of chemicals as he could carry for the wet process, some collodion emulsion for the dry, and a small portmanteau of supplies. Thus equipped, he started for Nicosia, the capital, which lies in a plain between two ranges of mountains. Before reaching Nicosia Mr. Thomson stopped for a night at Athenis, a village peopled by muleteers, who showed him great hospitality, and this was his experience throughout the island. No payment was ever expected for lodgings, and all that was necessary was to make a present to the servants or the children. At Kyrenia he employed a dragoman, an Arab shopkeeper, and a very intelligent man, speaking four or five different languages. As business was bad he gave up his shop for a time, and engaged himself to Mr. Thomson for twelve shillings a day. The dragoman was supposed to know every part of the island, but this turned out incorrect, and Mr. Thomson found him on several occasions to be useless as a guide. Indeed, the dragoman had an important object in joining Mr. Thomson, which was to call upon his customers in the different towns, and remind them of the stock of maccaroni, soap, and matches he had in his store at home. However, on the whole, he managed to attend to Mr. Thomson's affairs and his own pretty well, making himself useful in cleaning glasses, setting up the tent, &c.

With regard to the health of the island, Mr. Thomson remarked, in passing, that it was not nearly so bad as had been reported. The inhabitants in the interior were a fine race of people; there was very little sickness and no physicians. When anybody was ill—say with headache—he made a model of his head—not very artistic, perhaps, but a near enough—and deposited it in the church before some saint as a native offering, so that the saint might be reminded of the cure which was desired. The Cyprus fever was not a very dangerous one. He (Mr. Thomson) had rather a bad attack, but he pulled through it in about a week. His worst photographic experience was when ascending Mount Olympus. He rose very early for the purpose and found the morning very gloomy and threatening. However, about five o'clock he determined to start despite the great masses of clouds gathering up. The dragoman and the chief at whose house he was staying both prophesied rain, but, as he said he should have no other opportunity, they at last started to ascend the mountain. When the summit was reached the rain came down as it only could in those latitudes, and by the time they had set foot on the ancient shrine which crowned the height the hills shook with thunder and the lightning flashed, the whole forming one of the most terrible storms he had ever experienced. The tent was nevertheless erected, and the chief, who was clad in an enormous fur greatcoat, took shelter under it, while the muleteer took refuge under the saddle-bags. However, in spite of all the difficulties, he succeeded in bagging one photograph, and then the party prepared to depart, the chief, owing to the pools of water which had gathered in his huge greatcoat, being with some trouble dragged from beneath the tent.

Mr. Thomson then gave an amusing account of his descent of the mountain, and concluded by expressing his willingness to give any information, to any one who wished it, in reference to his method of working in so hot a climate.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 2....	West Riding of Yorkshire	Oddfellows' Hall, Bradford.
" 4....	Photographers' Benevolent	160a, Aldersgate-street.
" 4....	Edinburgh	Hall, 5, St. Andrew-square.
" 4....	Bristol and W. of Eng. Amateur	Museum, Queen's-road.
" 5....	South London (Annual Meeting)	John-street, Adelphi.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

A COUNCIL meeting of this Society was held on Tuesday, the 19th inst.,—Sir Antonio Brady in the chair.

The minutes of the last meeting having been read and confirmed, the following members were elected:—G. G. Baker Cresswell, Esq., Rev. R. O. Yearsley, M.A., J. C. Hannynton, Esq.

The Secretary then read several letters from members expressing their satisfaction at the prizes received by them the previous year; and also a letter from Mr. Gunyon, stating that he had had nearly fifty negatives spoilt by bad varnish. He (the Secretary) mentioned that he had brought this letter specially before the notice of the Council, because he had received several communications from other members complaining of the same thing, and that he himself had been greatly troubled in like manner.

Mr. J. Glaisher suggested that the fault might be in the collodion rather than in the varnish.

After a careful examination of several negatives, it was the general opinion of the meeting that Mr. Glaisher was correct in his surmise.

The Secretary then laid before the Council the prizes, which were as follow:—Three silver goblets, two elegant, illuminated portrait albums, and six oil paintings in gilt frames.

These having been approved by the Council, a vote of thanks to the Chairman was proposed by Mr. Howard, seconded by Mr. Gooch, and passed by the meeting. A. J. Melhuish, *Hon. Sec.*

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

This Society met on the 20th September, when the chair was occupied by Herr Prümm, in the absence of Dr. Vogel, who was in Paris.

The Chairman announced the death of Dr. Schimann (a member of the Association, whose name is favourably known in this country), and, after a few eulogistic remarks upon the deceased, he (the Chairman) placed upon the table a copy of M. Janssen's new work.

Herr Majorkiewitz described an extra roof made of splits of wood for the protection of the roof of the glass-house from sun, snow, hail, &c.

Herr Quidde thought the usual sun blinds answered the purpose very well.

Some further remarks on the same subject followed.

A camera-stand, by Schippang, and one of Cadette's pneumatic shutters were then exhibited. The Chairman was then appointed to arrange for the proper representation of photography at the forthcoming Industrial Exhibition of 1879 at Berlin.

The Chairman mentioned that he had visited the Paris Exhibition along with Dr. Vogel and Herr Schaarwächter; but he had little to add to the reports already made. He (the Chairman) and the latter gentleman had visited the studios of MM. Nadar and Walery. M. Nadar's establishment was very simple and free from ornamentation, while that of M. Walery was quite the reverse. The prices were the same in both places, viz., forty francs per dozen *cartes.*

Herr Schaarwächter showed two of Walery's prints.

The Chairman then gave some particulars as to the extent to which electric lighting is carried in Paris.

Herr Mahlo followed with a description of the Jablochkow candle.

Herr Grimm, of Offenburg, presented to the Society a copy of a pathological work illustrated by enlargements from microscopic objects, such as blood corpuscles, sections of plants, &c.

A pair of colossal panoramas of Sydney and Melbourne, taken and sent by a photographic amateur, Herr Holtermann, were next shown and admired.

Herr van Rouzelen advised the Society to issue a weekly photographic advertising sheet, as the Society's organ appeared at too long intervals to be of much use as an advertising medium.

It was resolved to take the proposal into consideration, and shortly after the meeting was adjourned.

A second meeting of the same Society was held on the 4th October,—Dr. Vogel in the chair.

Herr Schaarwächter showed a number of finely-etched sheets of glass, intended to receive carbon transparencies, which he had brought from Paris; and, further, a number of picture frames in black wood and black and gold with convex glasses.

The Chairman said that in Paris he had seen numbers of very elegant frames for photographs in light bronze, ornamented in the Chinese or Japanese manner, with brownish flowers and leaves.

Herr Hartmann presented a series of 14 × 12 costume portraits of persons who had been present at the Crown Prince's fancy dress ball. He had endeavoured to get backgrounds and accessories in keeping with the various costumes.

Herr Wieske exhibited a design for a show-case. It consisted of an eight-sided pillar, having four wide and four narrow sides—the width respectively of wide and narrow pictures. The bottom of the pillar widens out into an eight-sided table for laying albums or single pictures upon.

Herr. Kannenberg showed some baths rendered water-tight by means of a new cement.

Herr Martini showed a collection of lichtdruck reproductions of celebrated paintings, such as the *Venus*, by Titian, the *Sybil*, by Kaufmann, a *Madonna*, by Holbein, &c.

Dr. Richard, of Männendorf, wrote to say that he would sell and demonstrate his new rapid process for 300 francs to a single individual, and at the rate of seventy-five francs each for parties of ten persons.

The Chairman, by request, related his experience with the new electric light.

Herr Prümm showed Herr Max Fritz's improved sciopticon.

The discussion of a new secret process terminated the proceedings, and the meeting was immediately afterwards adjourned.

Correspondence.

THE RAPID BOISSONNAS' PROCESS.

To the Editors.

Gentlemen,—I think, or I may say I am *sure*, that there must be some mistake in the rapid formulæ given in The British Journal of Photography for November 15, page 549. For instance: a ten-per-cent. solution of acetate of copper is recommended. But, on referring to Fownes's *Chemistry*, I find that acetate of copper is soluble in cold water in the proportion of only one to fourteen.

Is this not sufficient to throw doubt over the accuracy and efficacy of the formulæ given?—I am, yours, &c., A. L. Henderson.

London, November 27, 1878.

PORTRAITS BY ARTIFICIAL LIGHT.

To the Editors.

Gentlemen,—As business in this part of the country is nearly dead, I think it is our duty to do what we can to rouse it up again.

Seeing your notice in this week's Journal of the luxograph patent and the electric lights, I thought perhaps there might be something in them that would have that tendency, and resolved at once to write to you on the matter. I should like very much to ascertain your opinion of photography by artificial light generally, and what you think of the different lights proposed particularly.

Have you any idea how much it would cost to fit up the electric light in a studio, of course inclusive of the engine?

Do you know anything about how the Vanderweyde studio is succeeding? Are they turning out satisfactory negatives, and can they take anything but busts, as that is the only style of portraiture I have seen produced by artificial light?

Could you give me an idea of the relative exposures of the luxograph and electric lights and ordinary daylight?

Do you remember an artificial light which was introduced under the name of the "photogene?" Is this new light not the old one rechristened?

Do you know why the photogene did not succeed, as, according to the inventor's advertisement, it seemed to do all that is claimed for the luxograph?

If I have asked too much in the foregoing queries I beg to apologise to you; but if you could see your way to answering them I can assure you it will give great pleasure to many readers, and to—Yours, &c.,

Glasgow, November 23, 1878. "Glasgowgian."

[The queries of our Glasgow friend are so varied, although on one general topic, that we feel unable to answer them, and therefore publish his letter *in extenso* in order to elicit replies. Our own opinion, stated in general terms, is as follows:—There is no reason, either theoretical or practical, why as good portraits may not be taken by artificial light as by daylight; it is merely a matter of expense. The term "photogene" was applied to a lantern in which was ignited a certain pyrotechnic compound. The luxograph differs from the former instrument, *inter alia*, in having a large translucent sheet interposed between the light and the sitter. No special claim has been made for any description of light. The relative exposures required in the case of the various kinds of light mentioned by our correspondent depends entirely upon the intensity of each; and, as each can be varied at the will of the operator, a definite reply cannot be given to the query having reference to this point.—Eds.]

THE NEW "EMPIRE" PATENT OPAQUE CLOTH FOR BACKGROUNDS.

To the Editors.

Gentlemen,—May we beg the favour of a few lines' space to prevent a mistaken impression as to the above, which might otherwise arise from your report of the Technical Meeting of the South London Photographic Society?

You say that, in reply to a question, it was stated that the "empire" opaque cloth was supplied "in various widths *up to six feet.*" The question put to our representative was whether the material could be had *as wide as six feet*, to which he answered in the affirmative; but this is by no means its extreme limit, eighty-one, ninety, ninety-nine, and one hundred and four-inch widths being also manufactured.—We are, yours, &c., J. Avery and Co.

81, *Great Portland-street, W., November* 21, 1878.

RECENT MEDAL AWARDS.

To the Editors.

Gentlemen,—I only intended to call attention to the fact that the assurance given to the President was incorrect; but I will, at your request, give the grounds for my statement.

1. In more than one of the pictures exhibited by Mr. Payne Jennings, in frame No. 199, the skies are printed in an impossible relation to the horizon of the foreground, revealing at once to competent observers that two negatives have been used.

2. A gentleman in the country wrote to me to obtain him copies of the said prize pictures. They were so obtained and sent, but some short time after were returned to me with the following letter:—

"I have compared the prints sent with those in the Exhibition, and find, to my surprise, that in four out of the eight different skies are printed into the foregrounds in three cases from other sky negatives altogether, and in the fourth the same sky negative was used, but in a different position. I think the Council ought to consider if it is to the credit of the Society that such a thing should be possible, and whether, if it is deemed right to give medals to pictures printed from different negatives, some security should not be obtained from exhibitors *that pictures ordered and bought as copies of the prize medal pictures* should scrupulously and honourably fulfil that condition."

For myself, as this is a new question, and I do not imagine such a thing ever occurred before, I will not at present add any opinion of my own to my correspondent's; but I trust photographers may have something to say on the subject.—I am, yours, &c.,

Rosslyn House, Grove End-road, H. STUART WORTLEY.
London, N. W., November 26, 1878.

To the EDITORS.

GENTLEMEN,—We in Scotland have a proverb relating to the propriety of the "kettle" casting reflections upon the black colour of the bottom of its neighbouring utensil the "pot." Bearing in mind the free criticisms I heard made when visiting a photographic exhibition, not yet a hundred years ago, on certain clouds and seascapes exhibited by Colonel Stuart Wortley, in which the sky and sea seemed to be at such loggerheads as to have allowed the sun to march on through the heavens and its reflection on the water to remain where it apparently was long prior to the photographing of the sun—bearing this in mind, I ask if this well-known artist displays good taste in trying to pick holes in the sea and sky photographs of a *quondam* successful rival?

Who is there at the present day that can plead ignorance of the fact that almost all photographs having skies owe this piece of adornment to separate cloud negatives? I do not see how Mr. Payne Jennings can be held to be responsible either for the assertions of the President of the Photographic Society of Great Britain or for the innocence of such people as imagine that the clouds in photographs are taken at the same time as, and along with, the terrestrial or marine subject. "Those who live in glass houses," &c., &c.—I am, yours, &c.,

Edinburgh, November 25, 1878. AULD REEKIE.

To the EDITORS.

GENTLEMEN,—Replying to Colonel Stuart Wortley's letter concerning my photographs of yachts, &c., in rapid motion, I must first state that I always wished it to be clearly understood that in some cases clouds from separate negatives were introduced; secondly, I am unaware of any rule of the Society forbidding this method of procedure, always considering that it was for the jury to judge whether or not the effect was in harmony.

If the introduction of clouds from separate negatives were forbidden, nearly all the best landscapes at the late Exhibition would have been disqualified. If, however, I am to understand from Colonel Wortley's letter that he wishes to impute an attempt at deception on my part, I must accuse him of a want of gentlemanly feeling in the matter, as he should first of all have made himself clear as to the position I held with regard to the photographs in question.—I am, yours, &c.,

November 27, 1878. PAYNE JENNINGS.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The annual meeting of this Society will be held at the House of the Society of Arts, Adelphi, on Thursday evening next, December 5th, when the officers for the ensuing year will be elected, and other business transacted; after which papers will be read—one by Mr. W. T. Wilkinson, of Colombo, Ceylon.

AUSTRALIAN INTERNATIONAL EXHIBITION, 1879.—The regulations for British exhibitors have been approved, and are now obtainable, together with forms of application, from Mr. Edmund Johnson, Honorary Secretary of the London Committee, at the offices of the Exhibition, 3, Castle-street, Holborn. The space at the disposal of the Committee being limited, early application is recommended.

SUICIDE OF A PHOTOGRAPHER.—On Tuesday, the 26th inst., at Dundee, a photographer, named James Porter, residing in Perth, committed suicide by poisoning himself. He had been drinking a good deal, and while in the house of his brother-in-law took two small bottles from his pocket, and drank liquors from them. One contained whiskey, but after he drank the contents of the second he said he had taken poison. Medical aid was summoned, but Porter died in half an hour.

POLICE PHOTOGRAPHY.—The Paris correspondent of the *Baltimore Sun* gives to his readers a graphic account of some of the uses to which photography is put in Paris. Coming, he says, by the back of the Champ de Mars today I was attracted by a group round a photographic policeman, who was making rather awkward efforts to take a picture of an old house wherein an aged woman had suddenly died. I inquired into the subject. It appears that the poor old soul at eighty-seven years of age put out her lamp of life sooner than was expected by her neighbours. A young man had disappeared, and so had a few hundred francs. The police were put on the *qui vive*, and the first thing they did was to photograph the cold old corpse and then the house. Now they are looking for the missing youth to take his picture. It is amusing to see the varied uses that photography performs among the Paris police. First of all, they photograph themselves, from the highest to the lowest. Then they photograph some of their relations, and perhaps friends. They photograph all their first and second class prisoners. In the Exhibition their "rogues' gallery" is quite an array of celebrities, and would form a volume of sketches. Photography is applied in all cases of murder as to persons and places. Before the murdered body is moved it and all the surroundings are carefully photographed. This is done by a special number of the police in uniform, whose entire work is devoted to the subject. Photographs of grand masters of the art of roguery and rascality are exchanged between the police chiefs of all nations. Thus, today, you can see some portraits of the wayward sons and daughters of Baltimore, Washington, Richmond, New Orleans, Charleston, &c., in "places of honour" on the line of the Paris police fine art gallery. They are numbered, and this number is an index, historical and descriptive, book. The days of the dark lantern with the police are changed into hours of the camera, but not *camera obscura*. I am told that the list of crimes detected through the agency of photography is an extremely long one. See to what detective purposes has the original idea of the long-lost Daguerre come at last! Instances of forgery are numerous as being detected by photography. The Bank of France has a special photographic and scrutiny department for the detection of forged notes, bonds, &c. But its invisible portrait gallery for taking the likeness of a person without that person knowing it is unique and full of amusing anecdotes. On one occasion a distinguished-looking person came to the bank desk and presented a little package of bonds of a certain English loan. The bank clerk did not readily relish the looks of the bonds, though those of the person were quite the thing. Stamping a little hand bell—a signal to the photographer, who has his gallery in clear range of the applicant's desk, yet so constructed that it is not easily seen—the clerk engaged the stranger in conversation about the bonds, and in such a way that the photographer should have a good view of his face. This time a country schoolmaster, as honest as the sun of day, thrust his face in by the desk, and he was photographed in company with one of the greatest forgers of France. The sensitiveness of photography is illustrated at this bank when ink marks invisible to the eye on the original document become quite plain on the photograph You cannot alter, by writing, any paper but photography will detect the "meddlesome pen" sooner or later. An erasure on the paper, if done ever so smoothly, is discovered by photography. The character and style of chirography is also well tested by photography. Photograph some of the letters in a sentence, enlarge the photograph, and you have "a big guide" as to style easily followed and made a criterion. The Post-office Department here has its Photographic Director, and many a letter is opened, photographed, compared, and stored away for future evidence. Surrounded by such agencies, how well "honesty being the best policy" is proved to us. In the Exhibition you can see some instances of visitors there being unconsciously photographed. One old lady, however, discovered the police at their proceeding. Up she bounded. Over went, not only her chair, but the three near by ones; down she dashed her umbrella, down she pulled her veil, and she pulled her skirt over her head and turned her back in a triumphant air up to the rash policeman. "What!" she exclaimed; "taking my portrait for a prison! O Jule! Jule! where art thou?" I am sorry to say her spouse, Jule, was in the arms of Morpheus, and cared not for photography. She went and demanded reparation, and was mollified by getting a photograph of her enraged self.

EXCHANGE COLUMN.

Lantern slides, two sets, consisting of ten superior hand-painted, 3½-inch, in exchange for a good portable half-plate camera for outdoor work.—Address, BRADSHAW BROS., 12, Devonshire-street, Stockport-road, Manchester.

Wanted, a 10 × 8 glass bath, large printing-frame, dishes, condenser, argentometer, or any kind of photographic apparatus, in exchange for a magic lantern, a quantity of new photographic lantern slides, and four 4½-inch double convex lenses.—Address, J., 39, Wesley-street, Liverpool.

PHOTOGRAPHS REGISTERED—

John Owen, Newtown.—*View of Newtown.*

Leonard Varney, Buckingham.—*Interior of Buckingham Church.*

A. G. Massey, Armagh.—*Three portraits of W. G. Lyttle, as "Robin."*

R. Jackson, Leeds.—*Monument of the late Dr. Hook, in St. Peter's Church.*

J. B. Platt, Liverpool.—*Four portraits of the Rev. W. H. Dallinger, F.R.M.S.*

ANSWERS TO CORRESPONDENTS.

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

Tyro.—See page 43 of the present volume.

Pantos.—Not being aware of the composition of Sœhnée varnish, we are unable to indicate with certainty how it is made.

A. Johnson.—The omission was rectified in this Journal, and the complete formula will appear in our forthcoming Almanac.

H. Vermeesch-Adet (Dixmude, Belgium).—The annual subscription to the Journal, including postage to Belgium, is 17s. 4d., payable in advance.

G. Boyd.—Try the following toning bath:—Borax, three scruples; chloride of gold, one grain; water, *quant. suff.* This yields rich, soft, brown tones.

W. M. Phillips wishes to know the best method of making the double chloride of gold and potassium, as recommended by M. Davanne, for a toning bath.

Medicus.—If you attend the next meeting of the Photographic Society of Great Britain you will see conducted the whole of the operations of platinotype printing.

Z. Y. X. (Greenwich).—You are quite correct as to the facts, but wrong concerning the dates, for it was in 1872 that Mr. Crawshay offered prizes for certain large portraits.

H. Manfield.—Our correspondent has favoured us with a very fine transparency, prepared according to the directions for practising the Beechey process given in another page.

An Old Reader.—The cost of the specification is sixpence. It can be obtained at the sale department of the Patent Office. This department is now in Cursitor-street.

C. D. V.—Yes, we are quite conversant with the nature and details of the invention; and in the course of two or three weeks we expect to place our readers in the same position.

G. H. E.—There are no known means by which a wet collodion transparency can be toned so as to resemble the sepia colour of those Woodbury transparencies to which you make allusion.

W. A. J.—Add a few drops of chloride of gold solution alone, and then try again. It is our opinion that the inert condition of the toning bath is due to its having been overworked.

J. Richardson.—In preparing plates by the collodio-albumen process it is not absolutely necessary that the collodion be iodised or excited. The function of the collodion substratum is to a large extent mechanical.

Anxious.—The better way to proceed is to insert an advertisement in the newspapers in the locality in which the individual is supposed to be residing, and take into your account the fact that he may possibly have changed his name.

Henry.—It was a mistake to set about dissolving the gelatine in the manner you did. It ought to have been allowed to steep in cold water for two or three hours, and heat applied after that. By doing so success will certainly reward your attempt.

A. H. A.—None of the constituents of a portrait combination of lenses will answer for a condenser to a magic lantern. As an *objective*, however, a quarter-plate portrait lens answers well and defines a three-inch picture beautifully on the screen.

S. P. S.—Glaze the lower portions of the studio windows with ground glass, and also the whole of the sash marked No. 3 on the plan. By doing so there will be a great gain in the illumination of the sitter; and by a shorter exposure much better pictures will be obtained.

J. B. Neville.—Add to the old fixing bath a solution of sulphide of potassium. The sulphide of silver thus obtained may be converted into metallic silver by first drying and pulverising it, and, after mixing it with twice its weight of nitre, subjecting it to heat in a clay crucible.

A. P.—You are quite right in thinking that the "diary" and record of your photographic experience will be greatly appreciated by our readers. We are in hopes that your name will appear in our forthcoming Almanac as the author of one of the articles to be found therein.

T. M. F.—The condition under which a patent is granted is this—that if the the article patented be not new the patent falls to the ground. You may continue to employ the apparatus described as having been used by you without fear of being interfered with by any person.

G. S. Barclay.—When collodion bursts out and breaks off in layers from the glass soon after it has been immersed in the silver bath it is an indication that the bath is too weak or the collodion over-iodised. If, upon testing the bath, it is found to be of a proper degree of strength the remedy will consist in diluting the collodion with a plain or uniodised sample. On the other hand, should the silver bath be too weak silver must be added until it is brought up to about thirty-five grains to the ounce.

W. W.—The instrument is merely a piece of glass tube bent like the letter U, having a loose plug of cotton wool pushed far down one of its limbs. We do not know where it can be purchased, but you can very easily make one yourself by softening a piece of wide tube in the flame of a spirit lamp and then bending it to the shape required. It will also be advantageous to bend one of the limbs towards its upper end into something akin to the shape of the spout of a teapot, so as to afford facility for pouring out the fluid.

J. R. V.—Do not use any more of that sample of varnish, but pour it out. Try one composed of sandarac instead of dammar. The method you propose for ascertaining the most suitable proportions seems excellent. We here append a retouching varnish which was strongly recommended by a writer in *Mosaics* for 1877:—

Alcohol	32 ounces.
Sandarac	4 ,,
Chloroform	1 ounce.
Oil of lavender	½ ,,

The above varnish may be made more tacky by the addition of more oil of lavender.

H. J. Stuart.—Having burnt all the old filters, clippings, and trimmings of prints (before fixing), place them in a crucible with twice their weight of carbonate of soda and expose to a white heat. The silver will be found at the bottom of the crucible fused into a button. It is quite pure.

Erratum.—In our report of the Technical Meeting of the South London Photographic Society, in last week's issue, a printer's error occurs, in virtue of which the exhibition of a recently-devised printing-frame was credited to Mr. J. L. Lane instead of to Mr. J. *T.* Lane. Mistakes by the substitution or transposition of a letter will sometimes occur. In this case it has resulted in the name of a well-known camera-maker having been substituted for that of a practical photographer, Mr. John Talbot Lane. The name was "right to a T," but that letter makes all the difference.

Syntax.—It is quite impossible for us to say which of the two lenses is the quicker-acting, unless we be made acquainted with the focus as well as the diameter of each. When a lens does not work to focus two courses are open—either make such arrangements in the construction of the camera and dark slide as will ensure the lens working sharp, which is effected by having the ground glass adjusted to a different plane from that of the sensitive plate; or have the lens re-ground. The latter will prove the more satisfactory manner in which to get rid of what is undoubtedly a mild nuisance.

Rev. George Waterston.—An amusing application of photography consists in printing them on albumenised paper and then fixing them in a moderately-strong and freshly-made solution of hyposulphite of soda, special care being taken that they are not toned. After fixing wash *thoroughly*, and place the prints in a saturated solution of bichloride of mercury, which will cause the image eventually to disappear. Wash the invisible prints once more and dry them. In this state they will keep well for months. Next prepare a number of sheets of white blotting-paper by immersing them for one or two minutes in a saturated solution of hyposulphite of soda, after which they are dried. To develope the invisible picture it is only necessary to wet the blotting-paper and apply to it the invisible picture, which instantly becomes developed in a bold, black colour, much stronger than it was previously. You can easily devise other amusing applications of this principle.

Received.—F. York.—In our next.

Experience with Beechey Emulsion Plates.—Just when ready to go to press we received a note from Mr. W. Washam, in which he says:—"I find, in what I had written last week on this subject, one or two errors which rather obscure the sense, and of which I therefore send a correction. Line 17, 'with my moist plates' should be 'with my *next plate.*' From line 33 onwards, 'some from emulsion which I had made towards the end of summer, and I worked with others which had been prepared for me,' should be—'*some from emulsion which I had made. Towards the end of summer I worked with others that had been prepared for me.*'"

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,

For the two Weeks ending November 27, 1878.

These Observations are Taken at 8.30 a.m.

Nov.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
14	29·48	—	45	36	38	40	NE	Overcast
15	29·26	—	44	38	41	42	NE	Raining
16	29·24	—	46	39	40	43	NW	Cloudy
18	29·91	—	48	42	43	44	ENE	Cloudy
19	30·39	—	49	38	38	40	NE	Overcast
20	30·40	—	—	35	40	42	ENE	Overcast
21	30·14	—	44	39	39	32	E	Overcast
22	30·06	—	42	39	38	41	NE	Overcast
23	30·03	—	44	34	36	38	SW	Overcast
25	29·31	—	54	38	51	52	SW	Very cloudy
26	29·48	—	43	38	39	41	E	Overcast
27	29·44	—	—	35	36	37	NE	Raining

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 970. Vol. XXV.—DECEMBER 6, 1878.

ON NEGATIVE VARNISHES AND THE DESTRUCTION OF THE IMAGE.

At the last meeting of the Amateur Photographic Association the question was raised of the destruction of the negative image by the employment of inferior varnish as a protective coating, and a suggestion was put forward by Mr. Glaisher, and obtained the sanction of the members present, to the effect that the injury was rather due to faults in the collodion film than to imperfections in the varnish. This suggestion opens up a very wide question as to the real cause of a by no means uncommon and extremely annoying form of defect in negatives, and one which has hitherto been regarded as a purely physical fault; but if we are to accept the new view it is possible that we may have to consider it, to some extent at least, as chemical.

The deterioration or destruction of a negative after constant use or long keeping assumes different forms, which have been variously attributed to different inducing causes; but, in the majority of cases, damp has been looked upon as the immediately active influence, working, no doubt, in combination with certain physical defects in the film itself. While in many instances the result may indubitably be traced to the effects of damp, it is equally certain that in other cases where the result is almost, if not quite, identical damp can have had no possible part in the matter, and it is only reasonable that we should look to other circumstances to supply the explanation of the change which occurs.

If we divide the possible causes of destruction into two chief classes—physical and chemical—we may place under the first head those forms of the defect which arise apparently from unequal expansion and contraction of the film containing the picture, and under the second those in which the film itself undergoes change or decomposition. The results produced by the first class of causes generally take the form of vermicular markings or cracks over the whole surface of the plate, and are frequently removable by proper means if taken in time. In the second class the film itself appears to undergo a change, in which it loses its transparency and becomes granular, crystalline, and opaque—sometimes uniformly over its whole surface, sometimes only in patches. When this form of the defect is developed it may not unfrequently be got rid of by the removal of the varnish by means of warm alcohol and re-varnishing; but it occasionally happens that the application of such a mode of treatment causes the destruction or solution of the whole picture in such a manner as to lead to the supposition that the collodion film and the varnish had become so thoroughly incorporated in some way or other that the removal of one is impossible without the other.

We recollect a case in point. Some years ago we had occasion to remove the varnish from several negatives owing to the surfaces having become contaminated by continued contact with silvered paper. The whole of the negatives had been coated with the same varnish, and, with the exception of two, were from dry plates. The two exceptions were portrait negatives taken in the studio of a professional photographer but varnished by ourselves, and these two differed entirely in the character of the deterioration they had undergone as compared with the dry plates. The latter were merely discoloured by bronzed surface stains, which had no appearance of penetrating into the film, and which in the unstained portions retained its original transparency; the others, however, exhibited a very noticeable loss of transparency, and the stains were of a matt, sunk-in appearance, in many places spreading in a peculiar arborescent or crystalline form over a considerable area, and showing as brilliant metallic markings from the reverse side of the negative. In every case for the removal of the varnish we employed a warm dilute solution of caustic potash in weak methylated alcohol, and the peculiarity is that, whereas the dry plates withstood the ordeal perfectly and came out as clean and perfect as when newly developed, the two portraits immediately dissolved in much the same manner as we should have expected had ether been the solvent. We were much astonished at the result, and, failing to reproduce it with any other films in our possession, could only attribute it to some decomposition of the collodion film. We regarded it as a case of decomposition rather than of original peculiarity of the pyroxyline, because, had the film possessed the same characteristics when the varnish was first applied, it would seem probable that it would have undergone solution then.

At least the result proved the existence of a very wide difference in the nature of the two classes of films, and the visible change which had taken place further showed a far greater deterioration in the one case than in the other, proving, we think, that the character of the collodion film may have a very important bearing upon the stability of the negative, altogether independently of the nature of the varnish. But whatever the change may be, how is it produced? Pyroxyline, we know, undergoes a gradual decomposition by age—a change which ensues more rapidly, or at least is more evident, if the substance be preserved in a stoppered bottle. This is due no doubt to the fact that the nitrous vapours evolved during decomposition are confined within a small compass, acting and reacting upon the already-decomposing mass in such a manner as to produce more injurious results. An unvarnished collodion film spread upon glass would, however, seem to be free from this excessive tendency to decompose, and when coated with an impervious varnish, and the individual molecules isolated, as it were, from one another, it would seem almost impossible that any decomposition at all could take place. It is quite possible that, under exceptional circumstances, a rotten collodion film and a bad varnish may combine to produce destruction of the negative; but on which are we to lay the blame?—to the collodion or to the varnish? Perhaps neither is altogether in fault, and yet each has its share; in other words, if the varnish be beyond suspicion little danger need be feared from the collodion film.

But at the present day we have, unfortunately, to look with a good deal of doubt upon the varnish; the rage for retouching, and the consequent introduction of so-called "retouching varnishes," has, we fear, brought in a good many chances of danger. We do not speak only of those preparations whose sole purpose is to afford a suitable surface upon which to work with the pencil or other medium; but we look rather at those which are considered capable of serving the double purpose of forming a protective coating to the negative and, where necessary, by means of a little friction, providing a "biting" surface upon which to do the necessary work. It is to the alteration in the constitution of the varnish to meet these purposes that we look for the source of many of the evils of which we hear complaints; and we think photographers who value the stability of their negatives would do well to pay some little attention to the composition of the varnishes they employ.

Shellac, there is no doubt, forms the best protective coating we have, being at once both hard and tough, with no tendency to become soft and stick to the print under a hot sun, and little chance of scratching under ordinary treatment. Its only fault is its dark colour, if, indeed, it can be called a fault, for we know several photographers who employ a pure lac varnish without experiencing any inconvenience from that source. Bleached lac possesses many of the good qualities of the undoctored article without its dark colour; but the treatment it has to undergo to deprive it of its colour does much to deteriorate it for the purpose in question. Sandarac forms a very light-coloured varnish of considerable hardness, and with no tendency to adhere to the print; but it is brittle and easily scratched, and altogether devoid of toughness. These two resins form the basis of most of the varnishes in use at the present time, various other substances being added in small proportions to aid in obtaining special qualities.

Thus, benzoin forms a smooth and easy-flowing varnish, with little strength. Mastic, used in small quantity, gives a brilliant surface, while Venice turpentine, Canada balsam, and other similar substances are sometimes employed to give toughness to the film, but in conferring that property they also increase the chance of producing a "sticky" surface.

If we take a film varnished with a pure lac varnish, or one in which the lac preponderates, and submit it to friction with the bare finger, or even with the aid of an abrasion powder, we find that the polished surface is not destroyed; the varnished film may be worn away to the bare glass without producing a sufficient "tooth" to take the pencil. If, however, we perform the same experiment upon a varnish containing a considerable proportion of sandarac, a very small amount of friction is necessary to produce a dead biting surface upon which the pencil may be worked with as much facility as upon ground glass. The two resins are, in fact, totally different in their characteristics, the one being tough and elastic, the other brittle and powdery; and it is not difficult to comprehend in what manner these qualities may work in the formation of a reliable and trustworthy varnish.

In ordinary varnishes the powdery character of the sandarac is overcome by the addition of turpentine, Canada balsam, or castor oil, and these substances, while adding to the strength of the protective coating, do not to any appreciable degree, interfere with its uses as a retouching surface; moreover, if used in moderation, we do not suppose they produce any ill effect in the varnish or in *the film* when it is newly formed, but we have a very strong opinion that under the action of time their influence is anything but favourable. It is, in fact, to the preponderance of these objectionable ingredients that we attribute much of the fault found with varnishes, and we base our remarks upon experience not wholly confined to their photographic uses.

Of course retouching must be done, and it requires a suitable surface upon which to work. So far as it concerns a negative from which only a few prints are required, it is, perhaps, not material what sort of varnish may be employed to produce the necessary surface; but those who desire their negatives to stand the test of time may, we think with advantage, devote a little more attention to the nature of their protective covering than seems to be done at present. A large section of our readers who are principally interested in landscape work have little need of retouching in its strictest sense, and our advice to them is to shun any varnish which upon moderate friction gives a rough and "biting" surface. Such a quality is not needful, and it brings with it, where it exists, many dangers without any counterbalancing advantage.

A PORTABLE CAMERA-STAND.

The stand to which we here briefly direct the attention of our readers is one that, were it not for a slight misconception on the part of a subordinate, would have been exhibited at the recent Technical Meeting of the South London Photographic Society.

When folded up for travelling it forms a square compound rod, composed of the three "legs" placed in juxtaposition. Each of these legs is, in turn, composed of three elementary square rods hinged together in a peculiar manner to be presently described, a noticeable peculiarity being that the centre element is about four inches longer than those at either side. Having premised so much we must have recourse to the diagrammatic mode of description and utilise this form of graphic delineation.

The diagram represents the camera-stand when folded together. The point at which they are united is at a, where are seen three pins. These pass through a flat piece of brass, forming a hinge upon which the outer portions of the legs can partially rotate. It will be seen that this partial rotation takes place at the ends of the two external rods, but at a little distance from that of the centre one. It will also be noticed that the outer rods are straight, or have parallel sides until within a short distance of the jointed end, when the outside assumes a bevelled form. In this lies the leading feature of this stand.

Let us now suppose that the two outside limbs are being rotated upon their common hinge as far as they can go. What, then, takes place? The bevelled portions lie close up against the side of the centre rod, and cause the two sides respectively to stand at an angle as shown by the dotted lines of the diagram, which represent the form assumed by the legs when opened. In this position we have not shown the legs carried to their full extension, as it is unnecessary.

It now only remains for us to give the dimensions of the stand of which we have above given a description, and with which must be associated the name of Mr. William Morley, of Islington, as its maker, this gentleman having for many years been an enthusiastic amateur landscapist, and therefore fully alive to the requirements of the photographic tourist. The length of the centre limb is thirty-three and a-half inches, that of each of the two outer limbs twenty-nine and a-half inches, the whole, when opened out, measuring fifty-eight inches. It is unnecessary to observe that these dimensions can be indefinitely increased, but the figures here given are those preferred by Mr. Morley for a light, portable stand. With regard to the triangle nothing need here be said, as the means by which the legs are attached will be obvious. No struts or extension bars are necessary to keep the legs apart, for the upper projecting end of the central rod suffices to do this effectively.

From the foregoing description it will be seen that this camera-stand will fulfil its intended functions in a most satisfactory manner.

UNIFORM PYROXYLINE.

One of the most important additions that has of late been made to our knowledge of the means of producing pure and uniform chemicals was the communication from Mr. L. Warnerke, upon a new form of cotton wool, made at the Technical Meeting of the South London Photographic Society the other evening. From a theoretical or practical standpoint it is equally valuable—the latter to a degree only known to those who have been in the habit of making many experiments in pyroxyline manufacture.

There is, perhaps, no substance in the whole range of photographic chemicals more liable to produce disappointment with its working through the utter uncertainty and want of uniformity in connection with its properties. We can go to the dealer in chemicals and buy the rarest salts and chemicals, of the most complicated formulæ, and be able to predicate to a nicety the exact results which would be obtained by their use; but if we go into half-a-dozen of such stores, and buy as many samples of pyroxyline, we should find them, in all probability, to have as many different varieties of action when converted into collodion. If we have our own pet formula, and send it to be made up at half-a-dozen different manufacturing chemists, the probabilities are that each will deliver a product quite different from the rest; while to the occasional amateur the making of a batch of pyroxyline is usually considered a success if it simply possess the power to dissolve with ease in the mixed solvents.

But in the advanced state at which the technical aspect of photography has now arrived — to the emulsion processes we more especially refer—the uniformity and ease of production, with the regularity of a suitable pyroxyline, is a matter of paramount importance. This material plays, as has been repeatedly shown in these columns, a most important *rôle* in the quality of the work; and we cannot but record our impression that Mr. Warnerke has again put photographers under an obligation by bringing before them this new preparation of cotton-wool.

It needs no argument to prove that the true causes of all the variation that occur in the working of the various processes cannot be properly investigated if we work by rule-of-thumb, or if we make use of chemicals of whose properties and conditions we are ignorant. Some of the difficulties in this direction were pointed out by us last week. Of course, if we find that with certain materials treated in a particular manner we obtain success, it is an easy and, perhaps, a wise matter to lay in a large supply of these materials to ensure our being able to go on with similar success; but such a course is most unscientific, and far from being calculated to foster the growth of science.

Now, how stands the matter with respect to pyroxyline? Thanks to the able investigations of men of the calibre of Professor Abel and others we have a very good knowledge of the theoretical aspects of the case; and a host of names rise to mind when we think over those who have examined into the photographic properties of the compound in question. But no one yet has isolated the different impurities, so to speak, which are bound up with the various forms of cellulose as obtainable in commerce, and to which, in most part, we are bound to believe, are due the strong individual characteristics of pyroxyline made from various sources—paper, cotton, linen rags, &c., &c.

Our ideal form of this material is one made from pure cellulose, with a definite formula as to temperature, &c., so that, *if wanted*, we can make special preparations of substances analogous to the results of the acid treatment of the surrounding foreign matter, and be able to add them in the proportions required, though we believe it will be found that all necessary properties can be obtained by variations in the proportions of acids and of water, combined with suitable differences of temperature. If we consult works on chemistry we shall, however, find that to procure pure cellulose is rather a difficult matter, consisting, as it does, in treating cotton, paper, linen, or such like materials, with hot solution of caustic alkali, followed by washing and treatment with hydrochloric acid, then ammonia, more washing, and perhaps the whole treatment repeated once or twice.

We no not mean to infer that Mr. Warnerke's cotton is absolutely and completely pure, but we think it is in such a form that it can be most easily rendered pure. It is, however, in such a state that one most important cause of the varying results obtained in pyroxyline-making is, as his expositor pointed out, got rid of, viz., the difficulty of permeability of commercial cotton wool to liquids. When it is considered that a difference of two degrees in the temperature of the solvent is capable of making such an alteration in the quality of the result as to cause an increase or decrease of one or two per cent. in the weight of the product, the necessity for a material easily penetrated by the mixed acids need scarcely be pointed out, seeing that the immediate action of the acid upon the fibre is to elevate the temperature, and when its action is confined there must be irregularities in the qualities of various portions of the same batch.

We found with others also that the plan—first, we believe, invented and published by Mr. Hardwich—of boiling the cotton in a solution of caustic potash before placing it in the acids added most materially to comfort in working and excellence of results, and we anticipate that to a still greater degree will the new cotton facilitate the manufacture of pyroxyline of uniform quality, owing to the mechanical qualities alone of the material, leaving aside for the nonce the chemical substances with which it may or may not be encased or contaminated.

RECENT PATENTS.

No. XXIII.—WHITE'S HEAD-REST.

It is almost a source of wonler to find a notice of an invention in head-rests that does not emanate from Leeds—a town in which so many improvements in this useful piece of apparatus have had their origin. The present invention, which received provisional protection only, is by Mr. James Paterson White, of Glasgow, and is described as follows:—

This invention relates to improved apparatus to be used by photographers for affording rest or support, and to facilitate the maintaining of steadiness by persons being photographed.

The improved apparatus comprises a horizontal bar or tube, which is to be fixed or held in any convenient way near the floor. To this horizontal bar there is adapted a long arm consisting of two or more pieces fitted to each other telescopically, or in an equivalent manner, so that the arm may be set to different lengths, pinching screws or equivalent appliances being used for fixing or holding the parts when set.

The arm is fitted to the horizontal bar so as to be capable of sliding along it and also of turning round it, and pinching screws or equivalent appliances are provided for fixing it in any position. The arm itself may be made so as by being screwed inwards or outwards in its foot piece which connects it to the horizontal bar to fix or loosen it thereon.

Any position within the range for which the apparatus is constructed can be given to the outer end of the arm (which is formed with or has attached to it the usual head-rest details) by adjusting it in one or more of three different ways, namely, sliding along the bar, turning or moving angularly on the bar, and lengthening or shortening of the arm.

Where an additional support is wished this may consist of a rod capable of being turned on a pin fixed in a piece which is fitted to turn and slide on the arm, pinching screws or other fixing appliances being provided. The overhanging weight of the arm may be counterbalanced by adding weight to the foot piece on the opposite side of the bar. Two or more arms may be mounted on the same bar to be used in photographing groups or otherwise.

If suitable means be adopted for preventing the horizontal bar upon which the head-fork is supported from being seen, which will prove very difficult, the system will be found useful.

No. XXIV.—SCHERING'S PYROXYLINE.

While entertaining the opinion that Herr Schering, on whose behalf the patent has been obtained by Mr. F. A. Zimmerman, somewhat overrates the difficulty of preparing pure nitro-cellulose for collodion, we are still pleased to find such an account of his method of treatment as that described in the following specification:—

The preparation of a pure nitro-cellulose for photographic and medicinal collodion has hitherto been accompanied with great difficulty, although this substance plays a very important part not only in photography but in pharmacy also.

The collodion wool, also called pyroxyline, which has been manufactured up to the present time has always presented many inconveniences; it retains in it an acid compound that cannot be removed by simple washing. But this acid compound is extraordinarily troublesome and detrimental in the application of collodion wool.

When the pyroxyline containing it is employed it yields a red and useless collodion, and the collodion prepared from it for pharmaceutical purposes is irritant to wounds. This acid compound is separated by a new and peculiar method, according to which the pyroxyline is treated for a considerable time at a warm temperature with a dilute solution of potassium permanganate, then with a very dilute solution of sulphurous acid, and finally washed well with distilled water. The celloidin prepared as above described may be in liquid form or in a condensed form, such as gelatine, in which state it is rendered inexplosive, more compact for transport, and more convenient for the consumer, who can regulate the proportions of collodion desired. This preparation is called "celloidin," it being the purest nitro-cellulose. It gives with pure ether and alcohol a collodion that does not become acid, and with sensitive salts of iodine, such as ammonium iodide and sodium iodide, is coloured only faintly yellowish and not brown.

Medicinal Celloidin and Collodion.—This is prepared either direct from the celloidin by dissolving it in a certain quantity of alcohol and ether (according as a one, two, three, or four per cent. collodion is desired) or from the celloidin gelatine by dissolving it in certain proportions of ether and alcohol.

Celloidin Collodion for Photography.—This is prepared with celloidin, according to the degree of concentration required, by the addition of pure alcohol and pure ether, similarly to the preparation of crude photographic collodion. Also as a finished iodised negative collodion, which is remarkable in that it does not undergo change in the iodised condition, and is therefore suitable for exportation.

Other ordinary collodion in the crude condition must be kept apart from the iodising material, and the latter must be transported separately.

Having now described the nature of the said invention and in what manner the same is to be performed, I declare that I claim the treatment of pyroxyline in the manner described, whereby the substance herein called "celloidin" is prepared.

As pyroxyline of the kind described is, we believe, now to be obtained in London, those interested in the subject will be afforded an opportunity of ascertaining the comparative merits of the old and new methods of preparing pyroxyline.

No. XXV.—RENDERING PHOTOGRAPHS TRANSPARENT.

This invention relates to a new method of, and apparatus for, waxing negatives or positive photographs, or other paper articles, which are required to be rendered transparent.

I provide a flat shallow box or closed vessel, of copper or other suitable metal, of a size corresponding with the work to be done, the box or vessel being supplied with a feed opening for supplying the same with water, and an escape valve or opening for the steam. Beneath the box or vessel I arrange a series of gas burners. When the box or vessel is filled with water, and the gas is lighted, the flat top of the box becomes heated to a regular heat all over, and I then take the photograph or other article and lay it upon a sheet of blotting-paper placed on the top of the box, and as soon as it becomes thoroughly heated I take a piece of white wax in the hand and thoroughly wax it all over. I then take a linen or other suitable cloth, and wipe off the superfluous wax from the surface. They are then placed in a press till cold or set, and the operation is complete. This operation will be found more rapid and effective than the usual process, and can be carried on without intermission as long as the gas is kept lighted and the box or vessel supplied with water.

Many devotees of the now extinct waxed-paper process will recognise in the foregoing a method that has often been employed by some of them for waxing their sheets of paper.

We can only add to what has been already said upon the subject of defects in "Beechey" films that we are even yet unable to see any valid reason for supposing that the cause is other than physical; that, in fact, notwithstanding the fresh evidence brought forward by Mr. W. Washam in his article in the present number, we fail in discovering any just reason for attributing the mottling and unevenness spoken of to a chemical source, nor do we recognise in the symptoms described any peculiar feature not perfectly in accordance with the view we have enunciated. Mr. Washam appears to be unable to get over the fact of the presence of mottling upon a dried and *unexposed* film, unless we suppose it to be formed by the imperfect removal of the decomposition salts from the film in washing; but this plain fact is itself, we think, the strongest evidence against Mr. Washam's theory. He speaks of some plates as being entirely free from the defect before exposure; and such films do not, he says, acquire the mottled appearance after exposure and development, showing conclusively that the effect is in the film itself. Now we will ask Mr. Washam to make a very careful survey of the facts, and to say if he can authenticate a single instance of mottling which was not visible immediately after coating the plate and before its immersion in water; in other words, can he state that he has ever had a film which, originally perfect and homogeneous, has developed the defect in question during the operation of washing? It will be quite time to enter fully into the possibility of the removal of the unevenness by the fixing solution and other points when we have established something more than a merely physical cause for the evil; meanwhile we can only look upon the special immunity enjoyed by the plates spoken of in his second paragraph at page 580, and also the entire absence (in Mr. Washam's experience, at least) of the fault in washed emulsions, as accidental circumstances in which there is no connection between cause and effect in the manner he would have us suppose. In the matter of washed emulsions we imagine there are few experimentalists who have not had abundant evidence of the mottling propensities of *washed* emulsion under favourable circumstances. A pyroxyline made at too low a temperature, or solvents containing too much water, will easily produce any amount of mottling without the faintest suspicion remaining of the presence of "by-products" in the film. Many causes operating upon the physical nature of the film may be named, but we do not think the facts justify us in laying the blame to any chemical influence.

PRACTICAL INSTRUCTIONS IN MODERN PHOTO-MECHANICAL PRINTING METHODS.

Part I.—PHOTOLITHOGRAPHY.

VII. Preparation of Transfers from Negatives after Nature.—If a piece of the ordinary gelatinised photolithographic transfer paper be exposed under an ordinary negative taken from nature, and the transfer is inked in the usual way, certain points of interest may be noticed on developing it with slightly warm water. The high lights of the picture will naturally yield up their layer of printing ink almost immediately, while the deeper shades of the subject remain jet black from the presence of an unbroken film of ink. As the development proceeds and successive portions of the gelatine film become softened by the action of the warm water, shades of increasing darkness lose their inky coating; and by increasing the temperature of the water it will be found that the ink may be gradually removed from every part of the transfer. During the whole of this operation a slight indication of half-tone may be noticed to exist in the form of a grain or stipple between the extreme black of the inky film and the clear white of the paper; but the range of gradation embraced by this half-tone is very restricted, as that which is visible at one time does not usually extend over more than one-sixth of the range of gradation existing in a good negative. Notwithstanding this, every degree of light and shade existing in the negative will be successively represented on the photolithographic transfer; but the deficiency of the process is due to the fact that only a fraction of the negative can be represented at the same time. If, for example, the lighter shades of the subject are correctly represented, all the rest is uniformly black; while if the darker shades are properly depicted the remaining portion of the picture is uniformly white.

By the use of the pasted paper recommended in the third chapter of this series a much more extended range of half-tones may be secured; and the extent to which the process is capable of reproducing half-tone depends, among other circumstances, on the nature of the paper employed.* A rough, unsized paper gives a wide range of tone, together with somewhat unsharp outlines, while a smooth paper will give less range of tone.

When it is intended to work from an ordinary graduated negative, the negative should be moderately dense and vigorous, and the process described in the third chapter, The British Journal of Photography, vol. xxv., page 497, is slightly modified, the operation being conducted as follows:—

The flour paste employed for coating the paper should contain eight per cent. of flour, or twice as much as when the process is made use of for line subjects. Instead of Rive's paper ordinary white blotting-paper is employed. This blotting-paper should not be wetted and mounted on glass before the paste is applied, but should be merely laid on a flat surface and coated with the paste by means of a soft brush. This having been done the layer of paste is smoothed by means of a long-haired badger brush, after which the paper is hung up to dry. When dry it is rendered sensitive by being soaked

* Photographic printing processes differ much with regard to the extent to which they are capable of reproducing half-tone, some being able to do justice to a negative having extremes of light and shade, together with all intermediate degrees; while other printing methods are only able to include a more limited range of tone, and, consequently, require a thinner negative. An unfixed silver print, made on moderately-sensitive paper, may perfectly represent all the gradations of a very dense or vigorous negative, but some of the gradations of tone are lost in the operations of fixing and toning. In the case of carbon or antotype printing the same wide range of tone is attainable when the process is properly conducted, although a thin negative is generally preferred for this kind of work. Collotype and most processes for photo-engraving in half-tone have a rather more restricted scale, and fail to do complete justice to a very vigorous negative. It is desirable that some standard scale of degrees of opacity should be recognised, to which the extreme degrees of light and shade in a negative could be referred. If this were the case certain difficulties connected with the varying sensitiveness of carbon tissue, &c., might be removed.

for a few minutes in a three and a-half per cent. solution of potassium bichromate, to which a small portion of ammonia has been added—say about one drachm to each pint. Care should be taken not to damage the pasted surface during the operation of sensitising; and the drying of the sensitive paper should be rather rapid, as slow drying favours an incipient insolubility, which is very prejudicial. The paper ought to be exposed immediately it is dry, and the period of exposure is about equal to that required for making a carbon print from a similar negative, or about half that which would be required in the case of a silver print. The exposure may be regulated by the actinometer, or it may be judged of by a periodical inspection of the transfer. In this latter case it should be continued until the details in the lights of the subject are just visible, and it is scarcely necessary to say that these inspections should be made by yellow light. The exposed paper is next soaked in several changes of cold water in order to remove all traces of soluble matter, and it is then dried, after which it is placed between folds of paper and ironed as directed in the previous case. The directions already given for the subsequent treatment and inking of the pasted paper transfer are applicable in the present instance; but it is generally advisable to employ a rather stiffer ink than in the case of line work, and it is of greater importance that the inking brush should be in first-rate order. The operation of inking affords scope for the exercise of some judgment, as the results may often be considerably improved by a little extra ink being applied to certain parts of the picture, or by reducing the amount adherent to other parts; in fact, this operation of inking with the brush gives one much the same control over the result as is attained by the operation of shading the back of a negative with tissue-paper and blacklead. Any touches of extreme black required by the deepest shadows may be conveniently applied by means of a small hog's-hair brush, while any heightening of the extreme lights which may be advisable is best performed by means of a very small hog's-hair brush rapidly applied; but it must be understood that in each of these cases the motion of the brush is an up-and-down movement, and not of a dragging or rubbing nature.

The transfer being now allowed to dry, any required retouching may be performed by means of the ordinary lithographic chalk or crayon. This having been done, the transfer is laid between sheets of damp blotting-paper until it is sufficiently moistened, after which it should be immediately transferred to the stone. Great care should be exercised in selecting a good stone for our present purpose. It should be rather soft and porous, free from any irregularities of texture, and it ought not to be too highly polished. Generally speaking the surface given by graining sand which has been passed through a sieve having one hundred or one hundred and twenty holes to a lineal inch will answer satisfactorily without any further smoothing or polishing. The picture, having been transferred to the stone, should next be gummed with *freshly-made* mucilage, and when this is washed off the first inking-in must be performed with a roller in first-rate condition, and charged with a very limited supply of stiff ink. The greatest care must be taken that the stone is quite cold when the inking-in is performed, as otherwise the ink will be softened by the heat, and the result will be the same as if a thin ink had been employed, namely, a clogging-up or destruction of the finely-stippled parts of the subject. During the whole of the inking-in the stone must be carefully observed, and should the slightest indication of clogging-up be noticed the conditions of inking must be altered in accordance with the principles already set forth. The first inking-in having been satisfactorily performed, the stone is rinsed, dried, and dusted with resin as in other cases, after which it must be etched with a very slightly-acidified etching fluid; and the strength of this should be generally about one-third of that required by a line subject under ordinary circumstances. During the progress of the etching the lightest shades of the subject ought to be carefully watched, in order that the stone may be immediately rinsed if any deterioration should be noticed.

During the operation of printing the following points must be attended to:—In the first place, the roller which is employed must be in good order—neither so new as to be imperfectly saturated with fatty matter, nor so old as to have lost all its granularity and elasticity. The ink must be very hard and stiff, while the greatest care must be taken to ensure a thin and uniform film of it on the roller. The least tendency towards any clogging up of the closer parts of the device must be immediately combated by the addition of a little acid to the moistening water, or by other means which will be considered under the head of "Failures;" and any difficulty which may present itself should, when possible, be tracod to its immediate cause. Printing from a stone bearing a device in fine stipple is the most difficult branch of lithography, and the beginner will find all his resources severely taxed in keeping the subject undeteriorated on the stone.

Many other methods of photolithography have been devised from time to time, some of these depending on the use of transfers, and consequently requiring direct or ordinary negatives; while other processes involve the direct printing of the photographic image on the stone, and therefore require reversed negatives. There is, however, no occasion to consider any of these numerous methods, as they are less suited to the requirements of ordinary work than those which have been brought under consideration, It is merely necessary to say that first-class photolithographic work may be easily and expeditiously done by Mr. J. R. Sawyer's method of transferring a line subject from a collotype plate to a lithographic stone; but it is obvious that the study of this process belongs rather to the domain of collotypic printing, under which head it will be considered.

The next article will contain a digest of the principal sources of failure incident to the operations already considered, and will conclude our study of photolithography. T. Bolas, F.C.S.

THE NITROGEN COMPOUNDS OF CELLULOSE.

In order to remove the existing uncertainty in connection with the composition and number of the compounds of nitrogen with cellulose, and to exhibit the influence exerted, under certain circumstances, by various acid mixtures upon cellulose, as well as to try to get at the cause of the remarkable properties of soluble pyroxyline, I resolved to nitrify cellulose (cotton wool, hemp, paper, linen, and straw) in various ways, and to examine the products.

In seeking to ascertain the contents of nitrous acid in the nitro-cellulose the usual method of qualitative analysis could not be employed, as it is too inexact and too detailed in practice.

According to Béchamp's* observations, nitro-cellulose is decomposed by ferrous chloride with development of nitrous-oxide gas. According to Schulze, the determination of the nitric acid in spring water rests upon the same reaction. It was, therefore, most convenient to use the apparatus described by Schulze, and to carry out the analysis in this way with but little change in the handling of the apparatus.

A similar but less practical apparatus is used by P. Champion and H. Pellet for the determination of the nitrogen in nitrogenous compounds. They boil the substance with a neutral solution of sulphate of protoxide of ammonia, and, after expelling the air, they add, by means of a funnel-shaped tube and a glass stopcock, a mixture of sulphuric and muriatic acids, and measure the quantity of nitrous oxide in the same way.

The following nitrifying experiments were made, as far as possible, with different sorts of cellulose, such as cotton wool, paper, linen, hemp, and straw, the first three of which had undergone no special previous purification. The cotton wool used was, however, the purest and most crisp which is to be found in the market. Purification by boiling with soda ley, and soforth, with subsequent washing, does not assist the acid mixture to force its way in, as Mr. L. Warnerke thinks. The paper used was a short-fibred filter-paper, which appeared to contain a considerable quantity of woody material. The linen was old bleached linen. The hemp was so far purified, by being repeatedly boiled in soda ley and in calcic chloride with a little muriatic acid, that it looked perfectly white and silky. The strawy substance prepared in the same way from straw was not suited for nitrifying, as it dried together in solid pieces, into which the acid penetrated but imperfectly. On this account straw was used in the form of paper, which was freed from its carbonate of lime (of which it contained three per cent.) by treatment with muriatic acid.

The sulphuric acid used had a specific gravity of 1.8424; the concentration of the nitric acid is mentioned in the respective experiments. On mixing the two acids the temperature rose to 60° or 80°. When the desired temperature had been obtained by cooling the vessel with water the cellulose was introduced, all air-bubbles were removed by pressing against the side of the vessel, and then the mixture was left to cool slowly, so that after standing from twelve to twenty-four hours it had a temperature of from 20° to 23°. Special care was paid to the washing of the nitro-cellulose, which took place either in running water or else by decantation and pressing out of the water—repeated and continued for days.

The pyroxyline was sometimes dried in a vacuum, sometimes in a current of air, and sometimes at an ordinary, sometimes at a less than ordinary, temperature.

The analysed compounds will be best compared with each other by means of the percentage of nitrous acid they contain, and then the tri-nitro-cellulose or its reduplication, the hexa-nitro-cellulose,

* *Zeitschrift für Analytische Chemie*, 1870, page 401.

is shown to have taken up most nitrogen of the six following compounds :—

$C_{12}H_{19}O_{10}$, NO_2, Mono-nitro-cellulose with 12·49 per cent. NO_2.
$C_{12}H_{18}O_{10}$, $2NO_2$, Bi-nitro-cellulose ,, 22·22 ,, NO_2.
$C_{12}H_{17}O_{10}$, $3NO_2$, Tri-nitro-cellulose ,, 30·06 ,, NO_2.
$C_{12}H_{16}O_{10}$, $4NO_2$, Tetra-nitro-cellulose ,, 36·50 ,, NO_2.
$C_{12}H_{15}O_{10}$, $5NO_2$, Penta-nitro-cellulose ,, 41·89 ,, NO_2.
$C_{12}H_{14}O_{10}$, $6NO_2$, Hexa-nitro-cellulose ,, 46·76 ,, NO_2.

The experiments shown in the following table were made with nitric acid having a specific gravity of 1·38 :—

Kind and Quantity of the Cellulose.	Number of the Experiment.	Sulphuric Acid.	Nitric Acid.	Temperature at the time of the dipping in.	Duration of the Action.	Nitrous Acid.	Observations.
		C. C.	C. C.	DEG.	HRS.	PER CENT.	
2 grms. cotton-wool	1	25	25	18	¼	33·74	Partly soluble in alcohol, soluble in mixture of ether and alcohol.
,, ,,	2	25	25	18	½	35·07	,, ,,
,, ,,	3	25	25	18	1	35·23	,, ,,
,, ,,	4	25	25	40	¼	33·72	,, ,,
,, ,,	5	25	25	40	½	34·72	,, ,,
,, ,,	6	25	25	40	1	35·13	,, ,,
,, ,,	7	25	25	40	24	35·62	,, ,,
,, ,,	8	37·5	25	40	24	39·99	Insoluble in alcohol, partly soluble in mixture of ether and alcohol.
,, ,,	9	50	25	40	24	41·58	Insoluble in mixture of ether and alcohol.
2 grammes paper ..	10	25	25	40	24	35·81	Insoluble in alcohol, difficult of solution in ether and alcohol.
,, ,,	11	37·5	25	40	24	39·05	Partly soluble in mixture of ether and alcohol.
,, ,,	12	50	25	40	24	40·32	Insoluble in mixture of ether and alcohol.
2 grammes linen ..	13	25	25	40	24	32·41	Insoluble in alcohol, difficult of solution in ether and alcohol.
,, ,,	14	37·5	25	40	24	35·88	Difficult of solution in ether and alcohol.
,, ,,	15	50	25	40	24	38·20	Partly soluble in ether and alcohol.
2 grammes hemp ..	16	25	25	40	24	32·68	Insoluble in alcohol, soluble in ether and alcohol.
,, ,,	17	37·5	25	40	24	38·99	Partly soluble in ether and alcohol.
,, ,,	18	50	25	40	24	41·21	Insoluble in ether and alcohol.
2 grammes straw material	19	25	25	40	24	36·23	Insoluble in alcohol, soluble in ether and alcohol.
,, ,,	20	37·5	25	40	24	38·47	Partly soluble in ether and alcohol.
,, ,,	21	50	25	40	24	39·40	,, ,,
10 grms. cotton-wool	22	100	100	60	24	34·77	Soluble both in alcohol and ether and alcohol.

—*Dingler's Polytechnischen Journal.* GUIDO WOLFRAM, *Dr.*

(*To be continued.*)

BEECHEY EMULSION PLATES.

In today's number of the Journal I read with interest the editorial remarks on my paper of last week, and I am trying to see how the explanations given are borne out by the facts in my own case. In one respect more especially I am not yet able to do this. Perhaps the Editors will kindly help me a little further. The first I refer to occurred to my mind after I had written my paper last week, and I should have mentioned it in a note had not my paper been already sent off.

Attached to my camera is a sunk box with a flap shutter. I often make use of this to give a considerably longer exposure towards the foreground than towards the sky. But this sunk box prevents my raising the front as much as I often require to do. I then remove it and use a sliding piece or an extra front, and, having no flap shutter with this arrangement, I sometimes neglect to give a longer exposure to the foreground, or, in other words, a shorter exposure to the sky; and it occurred to me, after sending my paper, that some of the negatives most free from the mottled sky were just those in which I had not made this difference of exposure between the foreground and sky. In those, consequently, the sky has received just that relatively better exposure spoken of by the Editors. Of course there is in this case a larger reduction throughout the sky part of the film, and this may render the mottling less perceptible; at least that was the explanation which occurred to my mind of the apparent greater freedom from mottling in those negatives.

By the "by-products" in my paper I mean the same thing as the "decomposition salts" in the editorial remarks. These, of course, are formed *throughout* the film—not merely on the under-side; and my view was that they might be left unwashed from the under-side. The Editors evidently think this not possible. I would still ask, therefore what is the cause of the mottling seen already on the dried, unexposed plate, and how can it be prevented? As I remarked in my paper, after the negatives had been prepared I noticed some of the films quite homogeneous—quite free from the mottling. In these plates it does not make its appearance after exposure and development; the finished negative is free from it. In other cases it is already visible in the film of the prepared plate over a portion or over the whole of it. In this case it may disappear in the fixing with the limitations mentioned in my paper, or it may be rendered worse by the developer and much less easily removed by the fixing agent. I have never seen anything of the kind in any of the washed emulsion plates that I have used; that was another reason which inclined me to think that the fault might rest with the by-products, or decomposition salts, not being thoroughly removed. My having found it also in Capt. Abney's beer and albumen plates seemed to point in the same direction.

I notice another correspondent, Mr. Manfield, speaks of the hardness and want of rapidity in the Beechey emulsion plates. My own experience is rather opposed to this. I spoke of it only in the first plates I prepared, and accounted for it by supposing a large excess of bromide in the emulsion, which I had not made or tested myself. Afterwards I took care to ascertain that only a very slight excess of bromide was present *after the silver had been in excess*, and I had no reason to complain of hardness or want of rapidity, nor yet want of certainty, except where the mottling in the film was excessive. Had these faults troubled me I should not have continued to feel the interest in the process which I do. I am sorry I have no more time to devote to it for the present. A few properly-conducted experiments might make the precautions to be adopted in practice very clear; and no doubt the explanations suggested by the great experience of the Editors in many directions will be valued by all those to whom I thought the few suggestions I could offer might be of interest. WM. WASHAM.

NOTES ON PASSING EVENTS.

BY A PERIPATETIC PHOTOGRAPHER.

THIS is an age for striking into new paths. I "guess that I have struck 'ile" in this direction. Like a good many other readers of the criticisms ou artistic photographic works at any of the exhibitions, both long past and recent, I have frequently been considerably "exercised" when studying the terms employed in the discrimination of merit in its various degrees. Well, to come to a focus, my idea is that of the compilation of an art and photographic critical dictionary. Naturally its circulation will be limited, but its uses will be obvious, and I am a philanthropist. *Every* photograph exhibited in any photographic exhibition during the past dozen of years was good, according to the critics of the two weekly photographic journals. (O! how plentiful and cheap must soap be in the metropolis!) But to say so in plain terms would never do. Bless you! such would be uneuphonious and unheard-of; therefore, the "good" must, like the Edison stream of electricity that is to illuminate our private houses, be subdivided into innumerable verbal ramifications, each of which must convey the spirit of the original in all its force yet in different terms. "Why!" you exclaim, "the 'Peripatetic' must mean a synonymical dictionary?" Good sir, you have hit it. Such a dictionary as applied to the critical notices of photographs, when every one is good, is just the thing that I *do* mean. How does the following "muster roll" of adjectives look by way of a sample? Good — superb — charming — nice—pretty—effective—excellent—beautiful — gorgeous — goodly—brilliant — magnificent — refined—handsome — lovely — fine — able — tasteful — delicate — elegant—classical—chaste—æsthetic—rich—florid — bold — characteristic—graphic—picturesque—truthful—and soforth. How much will critics feel obliged to me when I issue my dictionary of slang art-critical terms, which will also have an obverse side for the special benefit of such as issue bad, smudgy, ill-composed, out-of-focus, flat pictures with or without converging and curvilinear perpendiculars! Having the "cant of criticism" in my mind's eye, I wonder how it would do to have a critical notice of an exhibition with the degrees of merit, as distinguished from the merely descriptive part, conveyed by figures or marks instead of by the interminable "charming" and "fine" so redolent of photographic criticism generally at present.

The Technical Exhibition of the South London Photographic Society was fairly entitled to be considered successful, notwithstanding a statement to the contrary in a letter from one of the exhibitors. That writer does not appear to be aware that this kind of exhibition cannot, from its nature, be one of a highly-organised type. So far as I understand the design of the promoters, all and sundry—including merchants, manufacturers, dealers, and agents—may, and are invited to, send in their wares and make use of that meeting for the purpose of advertising them; it is, in short, a meeting at which "shop" to any extent may be represented. Observing that photographs taken by the "luxograph" were exhibited, I wonder that it did not occur to the introducers of this instrument, or apparatus, to bring it to the meeting and show it in action before the members and visitors. A portrait of the Chairman taken under such circumstances would have been prized by many of the members, and numerous copies would have been purchased.

Now that artificial light is coming somewhat to the front, let me suggest a very nice, intense light, and one that is easily managed. It consists of placing in a saucer a small heap of powdered saltpetre (nitrate of potash), and on the top of it laying a lump of phosphorus. When the phosphorus is ignited the light emitted is so intense as to enable photographs to be taken with great ease by its means. The phosphorus must be kept in a bottle of water, and a bit cut from off the stick when wanted, taking care to keep the knife under water when it is being used. A stick may be lifted out of the bottle and transferred to a flat vessel containing enough water to cover it when laid down on the bottom, in which position it can be cut into suitable pieces with ease. Care must be taken that it be not touched with the fingers, as burns with phosphorus are more serious and painful than those of any other kind.

(To be continued.)

SPOTS ON EMULSION PLATES.

[A communication to the Liverpool Amateur Photographic Association.]

I feel that it almost needs some apology for troubling you this evening with such a well-worn subject as *Spots on Emulsion Plates*, particularly when what I have to say is only in confirmation of what has usually been considered their cause, viz., dust. But it may interest and amuse emulsion workers to hear to what an unlikely and apparently innocent cause I succeeded in tracing that dust.

I have worked the collodio-bromide emulsion process for thirteen years, and spots were by no means a familiar characteristic until three years ago, when an eruption suddenly made its appearance and assumed a chronic form of such obstinacy in spite of all that I could do that but for my former experience, which taught me that they were not inherent in the process, I believe I should have abandoned emulsions altogether.

It would be wearying to you to detail the steps that were taken to subdue the enemy. As the conditions of working were apparently unchanged it was only natural to suppose the spots arose from insufficient filtering, and the changes were accordingly rung on cotton wool, tow, sponge, and cambric, and these were washed in caustic potash and alcohol and then the emulsion was allowed time for subsidence, but all without avail—the spots remained master of the position. It was getting serious, and that fine patience which is such a shining virtue of photographers was nearly exhausted.

One thing was certain, and that saved a great deal of trouble; for, as I worked with portions of the same substances as I had formerly used, it was clearly owing to some undetected error in my method of working. The only change that had been made was in the introduction into the room of a large paraffine lamp, it being more convenient to me, as regards position in developing, than the gas, and it was also used when coating plates. Knowing what a harmless thing paraffine is it seemed like going out of one's way to suspect it. Nevertheless the fact remained that the lamp was the source of my troubles, and a few tests confirmed the suspicion. It may be urged that many photographers use a similar lamp when preparing plates, and yet they are not troubled with spots; they are fortunate, but I still think my experience with the lamp may be of service in helping them to guard against danger.

You have probably failed so far to see the connection between the paraffine lamp and the spots. Let us analyse. In the ordinary paraffine lamp, as everyone knows, a chimney is used for the purpose of effecting a proper combustion of the oil; through this chimney the heated air rushes with considerable force. The column of heated air ascends to the ceiling, and, being impelled forward by the continuous rush of heated air, spreads to the sides of the room, descends, and runs along the floor to the lamp, and thus sets up a circulation more or less active according to the size of the lamp and the room, picking up on its way the particles of dust that, in my case at least, cause the troublesome "emulsion spot." It would appear that the heated air from gas burned in ordinary batswing burners has not the power to displace that in contact with the ceiling, and this explains why, in the upper part of a room, after the gas has been lighted some time, there is such an accumulation of bad air. And it is no doubt better that the bad air does keep to the ceiling; for, if argand burners, which require chimneys, are put on the gas, I am mistaken if the current they would cause would not prevent the accumulation of bad air near the ceiling by driving it into circulation in the room.

Enlightened by my lamp it was necessary to examine more remote parts of the room where I had been accustomed to consider the air, and, in consequence, the dust, totally undisturbed. It needed no great acumen to pitch upon a coil of vulcanised india-rubber tubing, which is generally covered with a fine coating of the sulphur used in its manufacture—sufficient of itself to account for the most virulent outbreak of spots. It was a natural transition from this to the pneumatic holder. If these be made, as mine is, with a ball of vulcanised rubber they must always be viewed with suspicion. The constant pressing of the ball for attaching or detaching the plate must send the dusty particles from the interior into circulation in the surrounding atmosphere. They should be made entirely of pure rubber. As they are exceedingly useful I now fill mine with water and empty it before beginning to work.

I now breathe freely, and the preparation of good, clean-working emulsion plates is once more as easy as plane sailing. Each batch of plates can be prepared with great certainty that spots will not be among their defects. I conclude by saying that I believe almost all spots—except, of course, those produced by free silver in the emulsion—are caused by dust, and, even in the most inveterate cases, a diligent search will doubtless detect their source, although it may not be a paraffine lamp. W. H. Wilson.

SUGGESTIONS FOR WINTER WORK.

I suppose it is an almost universally-recognised fact that, although professional photographers generally "read the journals," and many of them fully appreciate the patience and perseverance of the experimentalists to whom photographic literature is so much indebted, the instances are few and far between in which, as a result of such reading, any material modification has been made in the daily routine of ordinary work. While often admitting the beauty of a new process, or the convenience of a suggested modification, they remain satisfied to let well alone, and both would soon pass into the limbo of forgotten subjects if it were not for the energetic band of amateurs, some of whom are always ready to take up anything new and work it out to a successful issue. The amateur does not, of course, object to this; but the experimentalist, whose sole object is the improvement of the art, cannot help now and then feeling a little sore when he sees his (for the time being) pet process, which he has laboured so long to perfect, and which he *knows* to be more suitable for many of the purposes of the professional photographer than that generally employed, altogether ignored by those in whose interests it has been worked out.

No doubt the main cause of this apparent conservatism of the professional photographer is the alleged want of time for anything but professional work. He knows well that, in most cases, if the "man at the wheel" be not constantly on duty the ship will "come to grief," and his readiness to buy any secret process that may be offered would seem to show that he is quite alive to the advantages improvements would bring, if only they could be obtained without trouble to himself.

There is, no doubt, much force in the plea of want of time during the busy summer months. The photographer must "make hay while the sun shines," or he will not make it at all; but it will not, however, hold good at the present season and for several months still to come, when the time in which good work can be done will hardly average three or four hours a day. I am aware that many have other strings to their bows, but there is no doubt that there are many more on whose hands time hangs heavily. On those, and indeed on all connected with the art, I would strongly urge the propriety of spending some portion of that leisure time in acquiring a *practical* acquaintance with several processes, of which at present they know little more than the name, but which, if thoroughly mastered, would most certaintly increase both their popularity and their profit.

The following incident is a case in point, and fully illustrates the advantages likely to arise, when opportunity occurs, from moving a little out of the beaten path:—During a recent visit to a photographic acquaintance, who has for a number of years done a considerable portrait business in an important manufacturing town, I noticed for the first time a large number of landscape and architectural subjects both in his specimen cases and reception rooms. Knowing his former aversion to that class of work I inquired what had come over the spirit of his dream, and was pleased to learn that it was the outcome of his conversion to a belief in gelatino-bromide emulsion. His explanation of the matter was brief, but instructive. "The fact is," he said, "I had read almost all that had been written on dry plates, and seen many very fine pictures that had been taken on them; but the difficulties and uncertainties I believed to be inseparable from that kind of work kept me from ever giving it more than a slight trial, while I could always rely on making wet collodion do all that I required. But, although wet collodion is admirably adapted for studio work, with the dark room close at hand, it is altogether a different affair out in the field. At first, when sitters were not very plentiful, I was glad of a commission to go off for half-a-day to photograph a house or a landscape; but by-and-by I found it didn't pay. Even when the distance was but a few miles a conveyance of some kind was required and an assistant a *sine quâ non;* and, what with the time occupied in erecting the tent or "rigging up" a dark room, and getting things generally into working order, a single commission usually meant a whole day's work, which, although well paid for from the employer's point of view, always brought in less money than would have been realised from the sitters who were lost in consequence of my absence from home. Now," he continued, "I put a couple of gelatine plates into a double slide, walk if the distance be short, or drive if it be long, give an exposure of a few seconds, and am back again in my studio before I am missed, quite certain that when I develope in the evening I shall have got as good a negative as if I had employed wet collodion, and in less time than it would have taken to sensitise a single plate."

My friend's explanation of the cause of his conversion was no less instructive. One day, in the early summer, an amateur—a stranger to him—called and asked permission to develope one of a batch of plates that had been sent after him, and inquired regarding the proper exposure to be given to the plates, of which he was not quite certain. The permission was willingly accorded and the operation watched with much interest, the result being a negative beautifully clean but, in the opinion of my friend, flat and feeble—an opinion, however, which was soon changed, as on a print being taken from it as soon as it was dry he declared it better than anything he had himself produced, and, to use his own words—"You know I used to consider myself no 'small beer' at that kind of work." He continued:—"The exposure had been so short, the development so simple, and the result so perfect that I at once resolved to get a supply of plates from the same source, and after one or two failures, mainly from over-exposure and over-development, I found that I could succeed as well as my new friend. This gave me a new power, and instead of discouraging outdoor work I now court it, and find both pleasure and profit in its practice, without materially interfering with the proper work of the studio."

It is evident that this is a case in which where precept failed example succeeded. My friend might have read on to the end of the chapter without giving practical attention to the process which he now values so highly; but the practical demonstration impressed itself strongly on his mind, and produced that degree of faith in the process which invariably leads to success. I do not suppose that all photographers may be so fortunate as my friend, and "entertain an angel unawares" in the shape of a teacher of the gelatino-bromide process; but scattered through the pages of this Journal during the present and past year will be found all the information required to enable anyone of moderate ability to succeed as well as he now does. I feel assured that the leisure hours of the approaching winter cannot be better employed than in searching it out, and putting it into practice.

Of course it will be understood that daylight is not essential for this purpose, the practice necessary to lead to perfection being quite as well got by printing under a suitable negative with a gas or paraffine flame. There is, however, one precaution that must not be forgotten, and that is that the light of the ordinary dark room is not sufficiently non-actinic for rapid gelatine work. The experiments should be made with plenty of light, but light of a dark ruby colour; and for this purpose I know nothing better than the gas globes or paraffine chimneys of a deep ruby glass manufactured for Messrs. Mawson and Swan, of Newcastle-on-Tyne. If the former are used they should be covered with some arrangement by which the white light escaping from the top can be prevented from falling on the plate, as it is quite sufficient to destroy results that would be otherwise perfect.

There is another branch of the art to which the profession have never "taken kindly," but which *should* be popular and, consequently, profitable, and which may be practised as well by night as by day, namely, the production of vitrified enamels. A really good enamel is probably the most beautiful, most perfect, and most desirable form of small photograph; and yet these gems have never come into general use, nor attained anything like their deserved popularity. Why this should be so is a somewhat difficult problem; but I believe one cause to be the fact that the production has hitherto been confined to only a few operators. It is true that many have tried to introduce them to their *clientèle*, but when the execution of an order devolves on another the photographer introducing the article is very apt to do so in a half-hearted way, preferring, not unnaturally, to encourage work of which he would enjoy the whole profit to that in which, probably, the largest share would go elsewhere. If every photographer could produce his own enamels there is little doubt that the prices would soon arrange themselves to suit all parties; and, as the work can be done at periods when the operator could do nothing in the studio, an impetus might be given to this beautiful branch that would soon secure for it the popularity and patronage it deserves.

I know perfectly well that the great majority of photographers refrain from trying this kind of work, owing to a belief that it is both difficult and uncertain; but I also believe that opinion to be unfounded. Almost all that is known regarding it has been published again and again; and I feel certain that any artist who succeeds well in other branches of photography would, by a little patient practice and perseverance, succeed equally well in this department of the art. For this the long winter nights are admirably suited, the only light required being to produce the transparency, and that, as everyone knows, can be as well done by artificial light as during the day.

Without in any way implying that it is the best, or even as good as some other articles which have appeared on this subject, I may here refer to a description of the process I published in this Journal at page 486 of the volume for 1876. I have perfect confidence in my opinion that anyone who will carefully follow the directions therein given, and adhere to them till he acquire the necessary dexterity, will ultimately succeed in producing such specimens as cannot fail to attract the attention of his customers, and enable him to add a new and profitable branch to his business.

John Nicol, Ph.D.

THE REACTIONS OF CHROMIC ACID AND CHROMATES UPON SUBSTANCES OF ORGANIC ORIGIN, CONSIDERED WITH REFERENCE TO THEIR USES IN PHOTOGRAPHY.*

Influence of Temperature on the Sensibility of Chrome-Gelatine.

Temperature has but little influence on the sensitiveness to light of dry chrome-gelatine—much less than upon the still damp chrome-gelatine whose spontaneous insolubility it really accelerates. I exposed two exactly similar pieces of air-dried carbon tissue, sensitised upon a three-per-cent. bichromate bath, under two similar photometers—one placed in a room heated to 30° C., the other in a similar room the temperature of which was only 10° C. The experiment when repeated showed that both pieces of tissue possessed the same degree of sensitiveness. Wilson's[1] dictum that if in summer one expose chrome-gelatine one minute, in winter one must expose it three in consequence of the *difference of temperature*, must, I believe, be almost exclusively referred to the decrease in the chemical intensity of the light,[2] and not to the fall in the temperature; also, perhaps, the far higher absolute quantity of moisture in summer may have a part in producing that effect.

To a similar confounding of causes I believe the following opinion of M. Vidal's[3] must be attributed:—A negative requires one minute's exposure with a five-per-cent. bath and a temperature of 15° C., three minutes at a temperature of 10° C., four minutes at 5° C., two minutes at 20° C., and one minute thirty seconds at 25° C., when the concentration of the bath is one per cent. At a concentration of six per cent.

* Continued from page 546.

[1] *Photo. Archiv.*, vol. ix., page 181.

[2] Holitscheck's Tables of the Intensity of Light. *Photo. Corr.*, vol. xiv., page 51.

[3] *Photo. Monatsblätter*, vol. ii., page 363. *Bull. Soc. Franc. Phot.*, 1875, page 92.

Vidal would give the following exposure:—One minute fifteen seconds at 5° C., one minute at 10° C., forty seconds at 15° C., thirty seconds at 20° C., and twenty seconds at 25° C.

As already mentioned I could distinguish no influence exercised by temperature when the experiments with the different temperatures were made simultaneously with the *same tissue, same light*, and the *same length of exposure.* It is also supposed that previous to the experiment the tissues used have been stored together. To the foregoing remarks I shall yet add, with respect to the increase of the sensibility with the temperature, that the increase of the temperature of the air generally runs parallel to that of the intensity of the light of the sky. The fewer clouds the more light and the more warmth, in consequence of the sun's rays not being weakened. In this way the proportion between the increase and decrease of the intensity of the light, and the changes of the seasons with their accompanying temperatures, lead to erroneous conclusions.

The special difficulties of manipulation which accompany the various photographic methods at the different seasons of the year cannot be entered into here more minutely. It may not, however, be uninteresting to remark that it has been found necessary by experience to use in the carbon process a weak bichromate of potassium bath (about two per cent.) in summer and a stronger one (about five per cent.) in winter. If as strong a solution be usedin summer as gives good results in winter flat pictures totally devoid of brilliancy will result. I observed that a similar difference existed between printing in the sun and that done in diffused light; that is, that a negative which in the cool season of the year would be printed in the shade on tissue prepared in a five-per-cent. bichromate solution would not print well in the sun, or, at least, a brilliant print could only be got when the tissue was sensitised on a from one to two per cent. chrome bath[1]. Upon this fact, in conjunction with that mentioned at the beginning of this article, I believe the different preparations required in summer and in winter to be based. The difference of temperature principally affects the time which the prepared paper may be kept before printing.

Hannot[2] makes an important remark on the photolithographic (chrome-gelatine) process which has reference to the above:—"Photolithographic prints become harder in the shade than in the sun—a fact which may be utilised so as to suit the peculiarities of the negative."

Influence of the Commencement of Spontaneous Insolubility on the Sensitiveness of Chrome-Gelatine.

I have already mentioned that the *commencement of insolubility in chrome-gelatine decreased its sensibility.* Chrome-gelatine becomes insoluble not only through long lying in the dark or long heating, but also by the action of chemical agents, such as chrome-alum, tannin, gallic acid, &c. Such chrome-gelatine films behave differently towards light from freshly-prepared films, which still retain unchanged the solubility of the gelatine. On comparison of the relative sensitiveness of the two sorts of gelatine it appears that those sorts of chrome-gelatine which already contain, in consequence of the presence of certain agents, the elements of insolubility in the glue will become insoluble much more rapidly than those which have not yet begun to undergo that change. It does not, however, follow that in consequence of a certain degree of insolubility in the chrome-gelatine the latter will give a foggy picture; it can usually be developed as clearly as a fresh film, but a more powerful picture results.

It is an undeniable fact that chromated carbon tissue is distinctly less sensitive immediately after being dried than three days later.[3] This is because through the whole mass the spontaneous reduction of the chromic acid to chrome oxide has set in, as well as the consequent insolubility, which is at first slight, but which is increased by the action of light. When the reduction has taken place entirely in the dark a very slight impulse from light suffices to carry it on to its end, while with a perfectly-unaffected chrome-gelatine the light has more to do to produce the reduction. When a piece of tissue is sensitised with potassic bichromate and divided into two parts—one being stored over water and the other in common air—at the end of four days there will be a considerable difference in the degree of solubility of the two pieces in hot water, the one kept in damp air being the most insoluble. In order to eliminate the influence of the varying moisture contents upon the sensibility I next allowed both pieces of paper to lie in ordinary air, so that in two days they both contained the same quantity of moisture. When exposed and developed the piece which had first been kept in moist air, and which was much the most difficult of solution, proved considerably more sensitive than the air-dried and more soluble. The tissue difficult to dissolve printed two to three photometer degrees deeper, but required hotter water to develope it than the other.

Here the accelerating influence of the commencing insolubility (reduction) was evidently shown. This can be demonstrated by dividing a piece of tissue and exposing one half for a few seconds to clear daylight, and allowing the other to lie for twelve hours. By the progressive action of the light the insolubility penetrates pretty equally through the whole mass, and an experiment made with the tissue continuously kept in the dark and that exposed to the light for a few seconds shows that the latter is the more sensitive and furnishes denser prints, which, when developed with water of the proper heat, are perfectly free from fog.

Another confirmation of my view is that the addition of chrome alum to the bichromated gelatine actually increases its sensitiveness. Thus, if one per cent. of chrome alum be added to a sensitising bath containing three per cent. of potassic bichromate, the tissue chromated upon it will be about one-eighth more sensitive than tissue sensitised upon a bichromate bath without that addition; that is, the former tissue would print to the ninth degree of the photometer, when the latter prints to the eighth degree. Such tissue containing chrome alum is, however, less easily kept than the ordinary sort, since, as a rule, it loses so much of its sensibility as to become unusable on the second or third day, and at the same time it loses its solubility in hot water.

The slightly-begun insolubility of the chrome-gelatine, which is induced in various ways, has the same effect: it increases the sensibility to light. Still, it is not advisable to induce intentionally that commencement of insolubility as a means of accelerating the exposure; for it is a veritable two-edged sword, since the intentionally-developed difficulty of dissolving the chrome-gelatine might easily progress so far as to render it quite insoluble, and then the picture produced by the light could not be developed. To this division of the subject also belongs the observation that slowly-dried chromated tissue is more sensitive than rapidly-dried, so that it is difficult to hit at first upon exactly the proper length of exposure, as that depends also partly upon whether the tendency to insolubility has begun to operate.

It is very interesting also to remark that those parts of the chrome-gelatine film which light has reached become more rapidly insoluble when allowed to lie subsequently in the dark than those parts which have remained unexposed.

Under-exposed carbon pictures or lichtdruck plates, when allowed to lie in the dark for several days, gain in intensity in the exposed places. Abney's[1] discovery, which has been frequently substantiated, is worth noting. It is that carbon tissue only requires a quarter of the full exposure if it be subsequently allowed to lie fourteen hours in the dark.[2] In this way some splendid carbon effects have been produced.[3] According to Scamoni this intensification is more rapid when the air reaches the prints freely (that is, out of the printing-frame) than in the frame; therefore the box in which exposed prints are laid to wait until they can be developed should not close hermetically. This after-action of the light can only be prevented by washing out the undecomposed potassic bichromate.

According to a private letter from Leipold, he found that when chrome-gelatine films for photogalvanography and heliography were quickly (in about two or three hours) dried and then at once exposed and developed, they were never so sharp as those which were allowed to lie from six to ten hours in the dark after drying.

I consider this appearance of old chromated films difficult to dissolve, being more sensitive than fresh ones to be analogous in its whole range to the results of pre-lighting in the negative process. In this case the reduction is produced by an exposure of short duration, and yet the action on the exposed parts, which are afterwards to produce the picture, is sufficient. J. M. Eder, M.D.

(To be continued.)

[1] Thin negatives furnish very brilliant and powerful carbon pictures, which are as beautiful as those from dense negatives printed in diffused light. (Rowell, *Photo. Archiv*, vol. viii., page 290.)

[2] *Topographie et Reproduction de Cartes.* Paris, 1870, p. 312.

[3] Baden Pritchard (*Photographic News*, 1872, p. 92,) maintains that chrome-gelatine films for carbon printing are in the best state for use and more sensitive on the third or fourth day after being sensitised than immediately after. After that the sensitiveness decreases again.

[1] See Audra, *Bull. Soc. Franc. Phot.*, 1872, p. 146. Jeanrenaud, *Ibid.* p. 146. Waterhouse, *Photographische Correspondenz*, vol. xi., p. 36. Dawson, *Bull. Soc. Franc. Phot.*, 1870, p. 225. Sawyer, *Photographische Mittheilungen*, vol. x., p. 95. Baden Pritchard, *Photographic News*, 1872, pp. 185 and 92. Stefanowski, *Photographische Correspondenz*, vol. xiv., p. 209.

[2] *Photographische Correspondenz*, vol. ix., p. 128.

[3] Sawyer, *Photographische Mittheilungen*, vol. xiv., p. 93.

FOREIGN NOTES AND NEWS.

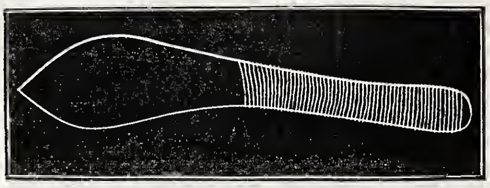
Wieske's New Show-Case.—Reprint of Eder's Treatise.—A Handy Retouching Knife.

Herr Wieske, of Berlin, lately exhibited a design for a photographic show-case, consisting of an octangular pillar, having four wide and four narrow sides corresponding in width to that of large and small pictures. At a convenient distance from the ground the pillar is surrounded by an eight-sided sloping desk-table, upon which separate pictures or albums may be laid. Another sketch showed a half pillar arranged on the same plan, and intended to be fixed against a wall. Herr Wieske thinks that one of these pillar cases, 2·5 metres high, and finished so as to stand in the centre of a room, would cost about 700 marks (say about £35), and for a wall case less in proportion.

Dr. Eder's treatise on the *Reactions of Chromic Acid and the Chromates upon Gelatine and other Substances of Organic Origin*, &c., which has been coming out in parts in the *Photographisches Correspon-*

denz, is about to be reprinted in a separate form. This treatise was "crowned" by the Photographic Society of Vienna.

The accompanying figure, taken from the *Photographisches Wochenblatt*, represents a handy knife used in the establishment of MM. Braun



and Co., Dornach, for pricking dark specks out of a *carte*-sized negative which is intended to be enlarged, or to lighten up dark places in the background.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 10 ..	Photographic Soc. of Gt. Britain	5a, Pall Mall East.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The annual meeting of this Association was held on Thursday evening, the 28th ult., at the Free Library, William Brown-street,—Mr. Thomas Clarke, Vice-President, in the chair.

The minutes of the previous meeting were read and approved.

Messrs. H. Norwood Atkins, T. W. Bruce, E. Bucknall, and Dr. Kenyon were elected members of the Association.

The Secretary then read the following—

ANNUAL REPORT.

The prosperity of our Society still continues, and though this is the fifteenth annual report there is no falling off in the number of its members, which is now sixty-three.

The meetings have been well attended, more especially when any practical illustrations have been announced, showing that, however interesting it is to hear a paper read on photographic subjects, it is still more so to be able to see the practical demonstration of them.

At the close of last year the Association joined with about twenty-two other societies in an associated *soirée* at St. George's Hall. The result was such a success that a general desire was expressed that another should be held this year. This was found to be impracticable, but the hall has been secured for the 19th February next, when it is hoped that a *soirée* more attractive and interesting than the last may be held.

The numerous dry processes have been well illustrated by different members, but the past season has shown the marked advance in the use of gelatine plates, as proved by the numerous specimens exhibited at the meetings.

Several papers have been read by the Rev. H. J. Palmer, which have no doubt attracted attention to the value of gelatine, viz.:—*A Further Improvement on the Gelatine Process; Cardboard Slides for Gelatine Films; Practical Demonstration of Palmer Films; Switzerland, from a Photographic Point of View;* and *A New Cure for Blurring.*

Mr. Kirkby read a paper on *Recovering Waste Silver in Printing*, and Mr. Wilson will read one on *Spots on Emulsion Plates.* In addition several novelties have been introduced by Messrs. W. J. Chadwick, Houlgrave, Ellerbeck, and others.

The Society's lantern has been much appreciated, and proved an attraction. By the addition of Chadwick's oxygen generator Mr. Weber was enabled to illustrate Mr. Palmer's paper on *Switzerland from a Photographic Point of View* most effectively.

The report would be incomplete did it not record the pleasant visit of several of the members of the Manchester Photographic Society to one of our meetings, who showed us several very interesting novelties. Some of our own members also made a return visit to Manchester, bringing back with them very pleasing reports of their hearty reception. These friendly meetings caused a desire to meet again on an outdoor excursion, and the result was a most enjoyable day spent together at Hawarden. Our own members had previous to this held an excursion to Speke Hall, which, notwithstanding the unpromising weather, proved a success, and Mr. Potter had the pleasure of carrying off the album which Mr. Forrest had kindly offered as a prize for the best negative taken that day.

The thanks of our Society are due for the presentation to them of the *Autotype Notes, Bulletin Belge, Journal of the Photographic Society*, and also to the Edinburgh Photographic Society for their presentation print.

The Secretary then read the Treasurer's report, showing a balance in favour of the Association after paying all expenses, and which after being audited was, together with the Secretary's report, duly passed.

The undermentioned officers were then elected for the year 1879:—*President:* Thomas Clarke.—*Vice-Presidents:* J. H. T. Ellerbeck and W. Horsman Kirkby.—*Treasurer:* A. Tyrer.—*Hon. Secretary:* Wm. Murray.—*Council:* Wm. Atkins, Rev. T. B. Banner, J. A. Forrest, Wm. King, Rev. H. J. Palmer, E. Phipps, W. E. Potter, E. Twigge, J. W. H. Watling, Ed. Whalley, H. A. Warmby, and W. H. Wilson.

Mr. W. H. Wilson then read a paper on *Spots on Emulsion Plates* [see page 581], after which a discussion followed, in which Messrs. Boothroyd, Palmer, and Twigge took part, it being the general opinion that no spots resulted from an enclosed paraffine lamp.

Mr. Potter exhibited his album, which contained a collection of prints with some very fine natural sky effects.

Some exceedingly successful photographs of children, taken in an ordinary room, and some taken out of doors of animals, on Swan's plates, caused considerable attention and inquiry respecting exposure, &c.

The Rev. H. J. Palmer then gave a very successful demonstration of enlarging with the lantern, and afterwards developed the resulting negative and some transparencies with the ferrous oxalate developer, using a fine specimen from one of his film negatives to enlarge from.

Mr. Wilson said he was always pleased to find old members still taking an interest in the Association, and it was with pleasure he welcomed back Mr. Guyton, who had formerly held the office of hon. secretary.

Mr. Guyton briefly thanked the members for their kind greeting.

Hearty votes of thanks were then passed to Mr. Wilson and Mr. Palmer for their contributions to the interest of the meeting, and to the various societies who had presented their journals and prints to the Association.

The meeting was then adjourned until the last Thursday in January next.

Correspondence.

HEATING A SMALL DARK ROOM.

To the Editors.

Gentlemen,—I notice in your issue of October 25th an inquiry for an apparatus for heating a small dark room, also your reply to J. James on the use of paraffine oil as a fuel for making heat in drying bichromatised gelatine.

There are various patterns of stoves made in America for burning "coal oil," which I take to be equivalent to the parraffine oil you speak of. The best oil-burning stove I have found is called the "hot blast." I have two such in use for a long time, both for heating a room and for heating the drying-box for drying gelatine plates, and can speak in the highest terms of their efficiency. The tank is of cast iron, and the lamp has two flat four-inch wicks. It is so constructed that the tubes can be surrounded with cold water, and the stove gives a very powerful heat.—I am, yours, &c., Jno. Carbutt.

54, *North Ninth-street, Philadelphia, U.S.,*
November 13, 1878.

"FREE LANCE'S" CRITICISM.

To the Editors.

Gentlemem,—I notice that "Free Lance," in your last number, alludes to a paper read by me before the Liverpool Amateur Photographic Association. He has not expressed himself very clearly, but presuming that the word "collodion" is a misprint for "chloride," he seems to infer that I made out that the paper contained only two grains and a-half of chloride of silver, and that this amount was converted into twelve or thirteen grains of sulphide of silver, which is absurd.

If he refers he will find that I obtained about two grains and a-half of chloride *and* twelve grains of sulphide of silver from each sheet (= to about nineteen grains of Ag No_3), and this after printing from average landscape negatives; consequently the paper must have absorbed nearly an ounce of his imaginary thirty-grain bath.

I am surprised that my statement should have been so misunderstood; and, "sharp" as "Free Lance" usually is, he seems to have missed the "point" this time.—I am, yours, &c., W. Horseman Kirby.

Liverpool, December 2, 1878.

[We have little doubt that "collodion" is a clerical error for "chloride." "Free Lance's" meaning is rather "involved," but we presume he intended to indicate that, with the use of a thirty-grain bath, two and a-half grains of chloride from the washing of a sheet indicate that only two-thirds of a drachm of bath solution adhered to the paper upon withdrawal from the bath.—Eds.]

HEMERY'S PRINTING-FRAMES.

To the Editors.

Gentlemen,—With regard to Hemery's printing- and tinting-frames: they are certainly ingenious and, no doubt, will do all that is claimed for them, but it is only what has been done before.

In December of last year you published a description of my carbon printing- and tinting-frames; but in a letter in the previous week's Journal I directed your attention to a frame described by Mr. James Harris at page 176 of your Almanac for 1877. With this frame I can do any sort of printing in carbon. A landscape background, clouds, or anything else can be printed-in with the greatest ease; and when once the masks are set you may print away as fast as you like without any fear of the registering.

I use Ford Smith's waxed landscape negatives regularly, and I find no more difficulty in carbon printing than in silver printing; in fact, not so much, as I have only once to fix the mask to the glass, then I can print any number of proofs and introduce as many landscapes as I like.

The only objection I have to the Harris frame is the mode of fastening the paper to the back; but I am at work with a pair of frames in which I think I shall get over this.

Who Mr. Harris is I do not know, but personally I feel very much indebted to him for introducing a frame so useful for combination carbon printing.—I am, yours, &c., SAM. BAMFORTH.

Hollingworth, Hadfield,
Manchester, December 2, 1878.

RECENT MEDAL AWARDS.

To the EDITORS.

GENTLEMEN,—I had not any intention to impute "deception" to Mr. Jennings. Directly after the meeting I wrote to the President, asking him to tell me who *assured* him. He declined to tell me. Feeling it a matter of public importance that such a statement should not go forth uncontradicted, I called attention to it through the press. I beg, therefore, Mr. Jennings to dissociate my action from himself personally, and to believe that I raise the question on public grounds solely.

I regret that a personal attack on me appears, signed "Auld Reekie." I will remark only that *I* have at least the courage of my opinions and sign my name to them, be they right or wrong, and that of all things the most contemptible and cowardly is an anonymous *personal* attack.—I am, yours, &c., H. STUART WORTLEY.

Rosslyn House, Grove End-road,
London, N. W., December 3, 1878.

NATURE AND ART.—A person untutored in the art of painting might be induced to suppose that the perfection of art would be to depict nature as it really is; the more lifelike the resembles the higher the standard of the work. In sculpture this doctrince will, we believe, be freely admitted; the whole aim of the sculptor is to reproduce in his marble the exact poses, the same mouldings of limb and of feature, which would be looked for in the living subject. But when we pass from the reign of the chisel to that of the paint brush, we find a different principle guiding the hand and eye af the artist. The first desideratum seems to be that of effect, and the height of art appears to be to produce the greatest effect in colour and pose with the least amount of direct violation of laws of nature. Some violation is expected almost as a matter of course; it becomes a question of degree, and the talent of the painter lies in the real subservience of nature to his art, while the art is deluded into the belief that it is viewing an exact reproduction of nature. For example: a leading artist remarked to us the other day, in horror at the bare suggestion of shorn sheep figuring in landscape, "We never think of painting sheep without their fleeces." The natural question then arose, "What then do you do, when you depict an August landscape in England? Do you ignore the existence of sheep, and keep them out of the picture?" "Certainly not," was the reply; "if they suit the effect of the landscape, we should introduce them, and should paint them with their fleeces as a matter of course, for the sake of the effect." Again: bright green foliage, such as is seen in the month of May, is held by most artists to be crude, too glaring in its effect upon the eye, to harmonise well with the tone of the rest of a landscape. For this reason autumn scenes, with varied tints of the leaf in the fall of the year, are favourite subjects for the brush. But if it is thought necessary to date the scene of a landscape in spring time of early summer, the rules of colour are then too often found to predominate, to the destruction of nature. A certain amount of yellow and orange is necessary to the "tone" of the foliage; it may be thoroughly anachronistic, but anachronism is a secondary consideration when art is the object in view. As an instance of this doctrine, we have heard and read divers criticisms of a picture which is certainly one of the leading productions in the exhibitions of the year—to wit, Mr. W. Field's *Henley Regatta*. Some art-critics have remarked that the foliage is too "cold" or too "crude," because it shows hardly any other tint than that of midsummer green. We have heard that Mr. Field was advised in many quarters by artistic friends, who visited his studio while the work was in progress, to tone his foliage with a certain amount of autumnal tint for the sake of the effect upon the eye. But the artist, having studied the scene from life, and being aware that Henley regattas invariably fall at midsummer, or within a very few days of that date, was bold enough in this instance to stick to pure nature as his text, and to represent a Henley scene such as it really is, to anyone who has been in the habit of witnessing it. Perhaps "sea pieces," which depict waves breaking on shore in fair weather and in sunlight, present the greatest violations, as a rule, of the laws of nature. Two details are especially desired by the artist to give due effect to his pictures—the one the sudden curl of a good-sized breaker immediately in the foreground; the second, a deep tint of blue or of green in that breaker. As a contrast to that colour, a foreground of sandy beach is often the best. The natural results of a sandy bottom would be twofold. In the first place, the shore being thus gradually shelving—for sandy beaches seldom lie on a steep incline—the breakers, if of any large size, would begin to break some distance out to sea, and would then roll in one after the other, in broken foam; no large breaker, preserving its intregity to the very edge of the beach, could possibly exist under such circumstances. Secondly, the sandy bottom would be stirred up by the action of the waves, and the colour of the breakers would be brown. Yet to follow nature in these two details would mar the "effect" of the picture, and, as a natural sequel, nature and the law of fluxions are made subservient to the requirement of art.—*The Field.*

ADVICE TO INEXPERIENCED PHOTOGRAPHERS.—Mr. E. H. Train, of Montana, in the *Phil. Phot.*, gives some advice and directions of a thoroughly practical character to some of his brethren less experienced than himself in the art of taking good negatives:—Arrange your dark room so that it can be kept cool in summer and warm in winter, and be well ventilated (for health). Learn your light, and get control of it so that you can get your lights and shades to fall to suit you, taking care that the light on the eye is right, and do not get a "blind light" over the pupil. Buy none but the best chemicals, of reliable dealers. Now take a gallon of distilled water (more if your bath dish will hold it, and it should not hold less); add nitrate of silver enough to make it thirty-five or forty grains to the ounce. When it is all dissolved, separate one-third from the rest and saturate the two-thirds with iodide of silver; filter well and pour back the other third; sun a day or two if you have time, or it will work without. Prepare your collodion after any good receipt. Next put four ounces of protosulphate of iron in a two-quart bottle, add sixty-four ounces of water, cork tightly, and lay it on the table or floor, where you can give it a roll semi-occasionally, and it will soon be dissolved; let it settle and filter off sixteen ounces, to which add one ounce of acetic acid No. 8, and just enough alcohol to make it flow (which will be very little at first, and more as the bath accumulates alcohol from the plates dipped), and you have a reliable developer. Now try a plate, and see if it works clear. If there is any fog add nitric acid, C. P., a little at a time, to your bath until it works well. The above is probably not the best formula in the world, but it is a thoroughly reliable one. Now your chemicals are all right place your sitter so that his pose looks easy and graceful on the ground-glass (pay no attention to anything else). Slide your head-rest up until it just steadies his head without changing its position; talk him into a good humour with himself and the world. Now "shoot your gun off," and if you do not get a good picture it is your own fault; if you do you can do the same thing every time, as long as the conditions remain the same. The next thing is to know where to look for trouble when trouble comes. I see that some writers (who, by the way, are fine artists, and have had much experience) say they always look for it in their collodion. With me, on the contrary, if the trouble is not in the temperature of the rooms or chemicals, in ninety-nine cases out of a hundred I find it in the bath. Heat causes various and sundry troubles and cold some, although it is not so much to be feared. In hot weather keep your bath, developer, and plate-holder cool. Immerse your plates with a very slow but even motion, and let as little time as may be elapse between the sensitising and developing of your plates, and you will have little trouble from this source. But, to return: the change in collodion is very slow and always in the same direction, and any sample that will work clear once ought to do so always, or at least for a long time. Of course it will lose sensitiveness with age, and will, from evaporation, grow thick in the bottle you pour from, but that is about all, while the change in the bath, particularly if it is a small one, may be rapid, from the foreign matter introduced with the plates. I know that a change of collodion will sometimes remove a difficulty for the time, when, if the bath was all right, both samples would work. To illustrate: I once left my gallery in Montana (it is a long way from any place) in charge of a friend for some time, and when I returned he complained that none of the cotton I left him would make collodion that would work, and he had to send to Philadelphia for some. He showed me several bottles he had made at different times and condemned. I told him that it ought not to be "thusly," so I renovated one of his baths, and went to work and produced excellent work with every sample of his condemned collodion. But for all this I do not want you to infer that I would advise you to be always doctoring your bath; on the contrary, having got it into good working order I recommend that you let it severely alone; put into it absolutely nothing but the cleanest of plates, and these only when necessary. Do not call in every paper by which to try your "kimicles" on; so long as it works satisfactorily do not change its quantity or quality. If a scum gathers on it skim with blotting- or filtering-paper; filter it only when necessary, and it should work for a long time. When, however, you do get into difficulty, be sure first that it is not caused by the temperature of your rooms or some similar cause, and that your collodion and developer are the same that have been giving good results; and then if a little more acid in your bath will not set you right I know no remedy but to renovate your bath by neutralising and boiling, and that is a remedy that has never failed me for twelve years. To be sure "that none go away dissatisfied" you should always have two or more baths in good working order; for it does not improve your reputation as an artist to tell people that your bath is not working well today, and they will have to come again. Usually they will come no more for ever. To albumenise plates, soak them for a few hours in dilute nitric acid, wash thoroughly, rinse with dish-water, and flow with albumen. While wet flow them with about one-fourth of an ounce of albumen to four ounces of distilled water. Letting your plates dry after they come out of the acid will make the albumen refuse to flow.

EXCHANGE COLUMN.

An extra-rapid *carte* lens by Squire, cost £7 7s., will be given in exchange for a landscape lens by a good maker.—Address, F. Wright, photographer, Northampton.

ANSWERS TO CORRESPONDENTS.

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

PHOTO-MECHANICAL CORRESPONDENCE.

Hope.—Try the experiment. If you do not get the desired result you can hardly fail to learn something.

Lampblack.—The oil colours sold in tubes for the use of artists make excellent coloured inks for lithography; but as they usually dry rapidly clean your rollers immediately after use.

J. Carr.—The stone which you have been using is probably very porous, and thoroughly saturated with gum. Either prepare yourself for some hard work in grinding it down, or make an ink slab of it.

GENERAL CORRESPONDENCE.

F. C. S.—Of the two iodides that of magnesium is the more deliquescent.

W. H. Wright.—We have no means of knowing anything about the work to which you refer.

G. P.—We have not yet ascertained the address required. We shall send you a post card when we do so.

G. F. S.—The sulphuret and sulphide of silver are the same. The latter term is more generally employed.

Heaton Mersey.—1. The slight discolouration of the salt will not produce any deleterious effect.—2. Let the alcohol be made quite hot.

F. W. N.—So far as we can judge there is nothing in the colouring matter of the mount that will act injuriously upon the print.

F. L. S.—Let the organifier consist of an alkaline solution of gum arabic, sugar candy, and tannin, and you will obtain all the rapidity required.

Bargo.—By the addition of more kaolin the solution will rapidly become limpid and colourless. Shake well up previous to placing the bottle in the sun's rays.

"Client."—So far as we have been able to ascertain, the toning bath employed by the artist mentioned is the ordinary acetate bath, but care is taken not to carry the toning too far.

T. Smith.—As you obtain such uniform success when making use of the formula you enclose it is unwise to give it up in favour of something else, the nature of which is coquettish, to say the least.

Colonel Barclay.—It is difficult to account for the prints not toning, unless on the assumption of the sensitising bath being very acid, or of the paper having been excited on an old negative bath charged with iodide of silver.

A. B. Slater.—Let the water be boiled previous to its being used. This liberates carbonic acid, and the lime is deposited on the sides and bottom of the vessel in which it is boiled. It is this that causes boiled water to be "softer" than ordinary well water.

"Transparent," (and other querists).—No questions are answered in this department of the Journal unless they are accompanied by the name and address of of the correspondent, in addition to the initials or *nom-de-plume* under which he desire his answers to appear.

W. Weston.—Our correspondent has been employing gelatine emulsion from a sample of gelatine which cost only three shillings per pound, and with so much success as to have induced him to lay aside his silver bath In his estimation the drying, as regards its quickness or slowness, is not a factor in the production of blisters or frilling. We shall be glad to receive details of the process employed by our correspondent.

A Country Photo.—The posing of your *cartes* being very stiff, and the heads of your unhappy-looking sitters so very constrained in position, render it quite apparent that you do not use the head-rest as it ought to be used. Everything seems to indicate that you have first of all placed the head-rest in what was considered a good position, and that the head of the sitter has then been posed to suit the head-rest.

F. B. H.—1 The chief objection to the use of a portrait lens having a short focus consists in the necessity for placing the camera too near to the sitter, by which the projection or "drawing" of the figure is not so pleasing and harmonious as when the point of sight is at a greater distance.—2. The dimensions assumed by the image on the ground glass depend entirely upon the focus of the lens. The shorter the focus the smaller will be the scale of delineation, and *vice versâ*. See our Almanacs for 1870 and three following years.

Caution.—We are requested by Mr. S. S. Crewdson, of Union-street, Ulverston, to caution photographers against the blandishments of one of the fraternity who, having an abnormally "stiff leg" and professing to be an artist, has been obtaining photographs to colour. These he appears to be addicted to pledging, or otherwise disposing of in order to "raise the wind," preferably after having received payment in advance from those too-confiding photographers who entrust him with their money as well as their work.

An Operator.—There being no patent for the production of opal enlargements by the "camera" process, you are at liberty to practise it without any fear of hindrance. True, a patent did exist at one time, "but that was a long time ago"—certrinly over a quarter of a century.

T. M. F.—The *lichtdruck* process, by which works similar to your enclosed print was produced, has frequently been described in the pages of The British Journal of Photography, and also in several volumes of our Almanac. We cannot in this page go into such matters again.

M. A. B.—When ammonia is added to a nitrate of silver bath containing acetic acid, the precipitate that takes place is acetate of silver. The best method of treatment in such a case is to filter off the precipitate, and add a few crystals of nitrate of silver to make amends for the loss occasioned by the precipitation.

An Ardent Oldster.—1. The collodio-albumen process of Mr. R. M. Gordon has never yet been published—at least no such publication has been made in connection with the name of that gentleman.—2. The bromide emulsion and hot water processes may very easily be combined.—3. See our issue of August 22nd, 1873.

Ajax.—The invention appears to be one of a meritorious character; but whether it is of sufficient importance to be patented, or whether the patent would be valid, are matters upon which we must decline offering any opinion unless the proposed specification be placed before us, or at anyrate until the whole matter has been fully explained.

G. S. Sharpley.—Intense cold may be produced by mixing equal parts of nitrate of ammonia, carbonate of soda, and water. A simple solution of nitrate of ammonia in water (equal parts of each) will prove much more convenient than the foregoing, because the salt may easily be recovered by evaporation. This is much employed in India.

W. H. Langley.—The experiments appear to have been fairly conducted, and the degree of success obtained is quite encouraging. We cannot suggest any better method of procedure than that which you have adopted. By obtaining enamel tablets of a different kind of manufacture from those hitherto employed other and, perhaps, superior effects may be secured.

Geo. Davis.—The lens gives good definition on the ground glass, and the picture is as sharp all over the field as that given by any lens we have ever examined; but the over-correction for colour is so great that you will be compelled to rack out the lens to a considerable extent after focussing in order to get a sharply-defined image. The lens has been returned as directed.

Lethe.—The triple combination of lenses will certainly work when the central lens is removed; but the focus will be short, the field round, and the picture small. The central lens forms an essential element in the working of the combination, as it lengthens the focus, flattens the field, and to a certain extent equalises the illumination. From the foregoing you will be enabled to deduce an answer to your query.

Received.—T. G. Hemery, A. Ward, Alder and Clarke, and other correspondents. In our next..

Photographic Society of Great Britain.—The next meeting of this Society will take place on Tuesday next, the 10th instant, at 5a, Pall Mall East (the winter exhibition of the Water Colour Society being on view), when papers will be read by Mr. Henry Cooper on *An Emulsion Process*, and by Mr. Leon Warnerke on *A Case of the Destruction of the Latent Image on Washed Emulsion, and a Method of Revising the Same*; also, a practical demonstration of the working of his new platinum process, by Mr. William Willis, Jun.

OUR ALMANAC.—We once more venture to invite our readers to forward details of any unusual or interesting experiences in the various phases of photography which have occurred in the course of their practice during the past year, addressed to the Editor.——Our business friends who have not yet sent in their Advertisements are requested to do so before Monday, the 16th December. It should be remembered that *priority of position will be given to Advertisements according to the date at which each order reaches the Publisher.*

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For the Week ending December 4, 1878.
These Observations are Taken at 8.30 a.m.

Nov.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
28	29·50	—	44	35	41	42	NE	Raining
29	29·92	—	40	32	33	35	NE	Hazy
30	30·00	—	40	32	35	36	ENE	Foggy
Dec.								
2	29·98	—	42	35	36	38	NE	Overcast
3	30·09	—	42	34	36	37	ENE	Overcast
4	30·24	—	—	34	35	37	N	Overcast

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 971. Vol. XXV.—DECEMBER 13, 1878.

ON THE ARTIFICIAL LIGHTING AND HEATING APPARATUS EMPLOYED IN THE DARK ROOM.

The attention of photographers, more especially those who work chiefly with dry plates, has been directed by Mr. W. H. Wilson's article in our last number to a hitherto unsuspected source of annoyance in the preparation of the sensitive film; and, from the systematic explanation of the facts given by the author of the paper in question, there seems to be every ground for looking with suspicion in the direction he indicates.

It is not only, however, in the production of spots that a careful survey of the facts connected with our lighting and heating arrangements will afford a prospect of trouble, as we shall point out in the course of our remarks; and, without denying the accuracy of Mr. Wilson's observations, we think we can discern the possibility of spots arising under the circumstances he mentions otherwise than by the disturbing influence of a strong current of hot air. The strength of the upward tendency of the column of air rising from a lamp chimney is very plainly exhibited by simply turning up the wick to such a point as to cause the flame to smoke badly, when the stream of unconsumed carbon will be seen to pass from the chimney, and will rise in a perpendicular column for some distance before it commences to diffuse itself into the surrounding atmosphere. There must, however, we should imagine, be something almost volcanic in its violence if its lateral and downward progress be sufficiently rapid and concentrated to cause so complete a disturbance of dust particles as that described; and we think at least a good portion of the result may be ascribed to different causes.

If we interpose a sheet of glass or metal or any cold substance, and arrest the rising column of smoke, we shall find a very rapid deposition of particles of unconsumed carbon or lampblack, and as the deposit increases in quantity it assumes the character of feathery flakes and tufts, which after a short time gather sufficient weight to detach themselves from their support and float away in the current of circulating air. Now, it seems more than probable to our minds that the same sort of action may go on, on a smaller scale, without the interposition of any arresting surface, and that the particles of carbon, when they reach a cooler atmosphere, or wander out of the influence of the heated current travelling in an upward direction, become subservient to the ordinary laws of gravity, and gradually subside, attaching themselves to any surface, sensitive or otherwise, which may present itself.

Then, again, the gradual accumulation of smoke and dust upon the ceiling or upper portion of the walls within reach of the ascending current is liable to dislodgment, and cannot fail to add its quota of annoyance. Yet, in spite of this, we are aware of many instances where a paraffine lamp is employed invariably without any unusual amount of trouble on the score of spots; but then the circumstances attending such employment differ from those which prevail in Mr. Wilson's case. Owing to the vastly-increased sensitiveness of modern dry plates it has been found necessary to get rid of all chances of fogging by extraneous light reflected from the ceiling or other parts of the room, and this is usually done by entirely enclosing the lamp or other source of light in a "lantern," or chamber, provided with suitable means of ventilation. Under such circumstances the solid products of combustion, if any, will be to a very large extent confined within the lantern, and the small portions which may escape will take such a direction as scarcely to present any danger of reaching the prepared films during coating. With the older form of collodio-bromide plate, which affords a comparatively low degree of sensitiveness, the small amount of reflected light coming from the unprotected chimney does not form a serious difficulty, though the arrangement may be dangerous in other ways.

Another phase of danger in connection with the ordinary modes of illumination is found in the accumulation of foul air arising from the combustion of the illuminating material, whether it be paraffine or gas; and there is no doubt that far too many dark rooms are but poorly provided with the necessary means of ventilation for the removal of the foul gases. Two or three hours' work (a by no means unusual period) in a close and badly-ventilated apartment, in which the products of combustion are afforded no adequate means of escape, will produce such an impure atmosphere as to be almost unbearable to the operator, and we can scarcely doubt its injurious action upon sensitive films long exposed to its influence.

In addition, moreover, to any chemical action it may have, the vitiated and heated atmosphere also produces trouble in connection with the physical character of the film, especially when an emulsion is employed. It will often be noticed, in preparing a number of plates, that the first few films will be even and free from structure, but gradually a strong tendency to irregular markings and mottling will be developed, apparently from the rapid evaporation of the solvents and consequent thickening of the collodion or emulsion. But this does not constitute the whole of the cause, as thinning the preparation with ether and alcohol will prove. It arises rather from the effect of the heated atmosphere upon the fluent properties of the collodion, or, rather upon its "setting" powers, by which the surface of the film that is exposed to the over-heated air sets more rapidly than the under portion, which is in contact with the comparatively cooler glass.

For these, no less than for hygienic reasons, the question of ventilation becomes one of paramount importance, and it can only be thoroughly met, we think, by so modifying the illuminating arrangements that the products of combustion are altogether excluded from the operating-room, and with such products will also be removed that oppressive "stuffiness," together with much of the heat, which render the preparation of dry plates too often so unpleasant.

We have said that the modification of existing arrangements is the only means of thoroughly meeting the evil, and for this reason:—Ventilation in its ordinary sense means a continuous and perfect circulation of air, and this, in turn, is scarcely separable from an equally continuous circulation of dust, if the ventilation is to be efficient. A continuous circulation of pure air free from dust particles may be a scientific possibility; but it is not practically within the reach of the amateur, or even the professional, photographer. It is, therefore, necessary to isolate the causes of the evil, and to treat them separately. By excluding the products of combustion altogether from the apartment we decrease the quantity of impure matter to be removed therefrom, and consequently lessen the necessity for so violent a circulation of dust-loaded air.

To many of our readers the carrying out of this suggested modification may perhaps present some serious difficulty, but such is not the case, all that is necessary being the removal of a single brick from the wall in order to open a communication by means of a small tube or pipe with the flue or with the open air. The diameter of the escape tube need not be large, as we have seen an arrangement of this description which worked admirably, and from which the heated products escaped through a half-inch gas tube. It follows also that if the position of the lantern cannot be so arranged as to secure direct communication with the flue, the current of hot air may be conducted along a leaden pipe fixed to the wall like an ordinary gas pipe; but this tube must be so fixed that the current may have a generally *ascending* direction until it makes its exit.

A convenient form of lantern consists of a square or oblong box of wood of suitable dimensions, glazed on one or more sides with ruby glass, and provided with a door by which communicate with the lamp inside. This is surmounted by an overlapping lid or cap of sheet iron, which fits, not too tightly, upon the upper portion of the woodwork, in such a manner as to permit the door to be opened while it is in position. If a gas flame be employed it will be well, especially if the lantern be of small dimensions, to give a considerable depth to this surmounting cap, in order to keep the lower portion of the lantern cool, and to prevent the glass cracking. A lantern one foot square on the base, and fifteen inches to the top of the woodwork, surmounted by a conical-shaped lid eight inches deep, will be found quite roomy enough to stand the heat of a large gas flame without any chance of fracturing the glass or igniting the woodwork, *provided the ventilation be sufficient*. For the inlet of fresh air a number of holes are bored in the bottom portion of the woodwork, and the escape pipe is, of course, fixed in the sheet-iron cap. To prevent any escape of light from the inlet holes a few short lengths of three-eighths lead piping, bent to a curve or "elbow," may be inserted, and will prove a cheap, easily fitted, and efficient means of effecting the object.

An arrangement of this sort will also combine the advantages of a drying stove for small plates, as by adding a shelf to the sides of the sheet-iron cone the plates may be reared up to dry against the heated metal, proper precautions being taken to prevent their touching in any part, which would probably lead to drying marks. If further provision be made for regulating the ingress of cold and the egress of hot air the temperature of the cone may also be considerably varied to suit the different requirements of a drying-stove; but if the lantern be required for lighting purposes only it will be advisable to keep it as cool as possible.

In conclusion: when it is absolutely necessary to employ artificial light, the erection of a contrivance such as we have described will be found to add most materially, not only to the comfort of working, but also to immunity from many dangers and inconveniences which arise from a badly-planned light; all extraneous actinic light is avoided, while noxious fumes and unnecessary heat are reduced to a minimum; and last, but not least, a second source of heat for drying purposes becomes, in many cases, quite unnecessary, and the whole affair may be constructed for a few shillings.

MR. HENRY COOPER'S "RELIABLE" PROCESS.

Such an amount of interest is attached to the collodio-bromide emulsion process that we believe many readers will thank us for giving even an epitome of the process described by Mr. Henry Cooper at the meeting of the Photographic Society of Great Britain held on Tuesday evening last. Such an outline we shall now present, premising that the paper will be published *in extenso* in our next number.

The process is, of course, a washed emulsion one, this being the leading feature in almost every dry process that is now being introduced; and, to prevent misconception, we state that we here employ the term "process" as synonymous with "modification." From the fact that Mr. Cooper has been an assiduous emulsion experimentalist during the past thirteen years, and from the further fact that he has produced numerous exquisite photographs by this process, the outcome of his experience will be received with profound respect.

A stock collodion is made by dissolving 160 grains of pyroxyline in ten ounces of ether and six ounces of alcohol. A stock bromide solution is also prepared by dissolving bromide of zinc in alcohol in the proportion of ten grains to each drachm.

When preparing ten ounces of emulsion, five ounces of the stock collodion are placed in a twenty-ounce bottle, to which are added an ounce of the bromide of zinc solution and twenty minims of syrupy lactate of ammonia. One hundred and fifty grains of nitrate of silver having been dissolved in eighty minims of water, three ounces of alcohol are added to dilute this solution, and the whole, having been heated to the boiling point, is added to the collodion, the temperature of which is kept at a moderate degree of heat for some time. In a period of time varying from twenty-four hours to three days, twenty minims of nitric acid are added. Having been well agitated the emulsion is poured out into a flat dish to set. When dry the pellicle thus prepared is dissolved in a mixture of five ounces of absolute alcohol and five ounces of ether, ·720.

On the method of preparing plates we need not here speak, merely observing that Mr. Cooper makes use of the gelatine substratum described by him a short time ago in this Journal.

The development is effected by an extremely weak solution of pyrogallic acid, commencing with a half-grain to a one-grain solution, with one drop of a ten-grain solution of bromide of ammonia and one drop of a saturated solution of carbonate of ammonia.

As we have already stated, the full details will be given next week, but, we have said sufficient at present to enable our readers to try the process, the proportions here given being believed to be quite accurate. Mr. Cooper lays great stress upon slow development, believing that in this is to be found the most important means of securing soft, delicate negatives, full of charming half-tones while possessing all the requisite printing vigour. Indeed, he expressly sounds a note of warning respecting the importance of avoiding too much intensity, which, he correctly thinks, is the cause of thousands of negatives being spoiled.

We shall have more to say regarding this subject after we have been enabled to peruse Mr. Cooper's paper.

VARIETIES OF TONE.

The use of the word "tone" in connection with the colour of photographs has now become so fixed that any attempt to substitute another term in its place would meet with but scant success. The employment, however, of critical terms—indeed, of any descriptive expressions whatever—should be rigidly guarded in order to prevent that loose, inexact mode of stating artistic truths which, by substituting mere verbiage for instruction, is so liable to clog the wheels of progress. The word "tone," however, as used by photographers, is applied in such a special sense that, though it may be regretted a more suitable one had not been selected, there is no fear of confusion when only the technical aspect of the process is in consideration.

It is, comparatively speaking, but a few years ago that the aim of most printers—when alkaline toning was fairly accepted—was to get a rich black or purple black, and, concurrent with white skies, it was the prevailing tone of most pictures exhibited. The formula as first published may have had something to do with this; but, be that as it may, most of the warmer-toned pictures then seen were the products of old toning and fixing baths, still not entirely banished. After a time this purple tone, to some extent, was talked and written down, and a warmer one aimed at by many workers of the day; not in the sense of suitability for particular cases, but rather as a panacea—a sort of process, fine-art by rule—a given tone to be obtained and artistic excellence to follow at once. This is the bane of photography in a multitude of instances. Instead of thoughtful adaptation of known rules, in combination with the application of the ever-increasing store of new facts and new processes, the tendency is to seize hold of a new process and work it entirely to the exclusion of the old, which has so much of good in it, in the expectation that, by the use of a new formula, process, or secret, a high standard of excellence will be obtained, but which never can result, and never will, except from culture and experience, helped, it may be, we will not deny, by new inventions and methods of manipulation.

A marked and very gratifying change has, however, taken place of late, thanks, perhaps, to the aid of journalistic criticism and the presence of more cultivated minds among the rank and file of photographic workers; and now a glance at any large collection of photographs will show a great and pleasing variety in this quality of such work.

An attentive frequenter of exhibitions will, however, note two allied points in their connection—the increase of variety of tone in the works as a whole, and the adhesion to particular tones by the several workers. While character is thus given to a series and their individuality emphasised, there may be thought to be a danger of reverting to a specific process to entail artistic effect; but we think a closer examination would show that in few cases could the actual tone obtained be improved upon by the substitution of another, and for the explanation of this apparent contradiction to the scope of our remarks we must look not to the results but to the means. We think it will be found that, possessing a fancy for an especial tone, the artist has bent his means to that end. He has had in view, in mixing his solutions, selecting his paper and the formula for using it, and, above all, in taking his negative, the ultimate tone he wished to obtain, and made everything work in accordance. But, even then, it will be found that by high-class workers there are cases where the selected tone has been departed from when a particular effect has been desired.

Thus, in the so-called "Rembrandt" pictures—another improperly-used expression—nearly every printer eschews the use of a cold tone; for, unless negatives and everything in connection is in a state of perfect excellence and accordance, cold pictures with heavy-looking shadows predominate. So in all pictures couched in a dark key will warmer tones be found more desirable, the shadows especially being then so much more transparent. A cool, purplish-grey, on the contrary, is very suitable for delicate, light-looking subjects possessing but a small amount of dark points. Children in light dresses, busts of fair women with light drapery, and cognate subjects lend themselves in a delightful manner to this kind of treatment, and more particularly on a small scale.

On a large scale a greater variety of treatment of all styles is allowable. The wonderfully-beautiful studies in red, by Faulkner, are doubtless familiar to all our readers. This is, however, such a bold flight that we would not recommend it for imitation to any but a master, for this tone adapted to a pretentious portrait with no other qualities to recommend it would be *bizarre* and laughable. Thanks to the facilities which autotype printing offers there is now no practical limit to the tone obtainable; but this point will fall more particularly under the head of the technical means of varying the tone, which will be treated of in our next number.

RECENT PATENTS.

No. XXVI.—TYPOGRAPHICAL ETCHED PLATES.

This invention is the joint outcome of Messrs. Capron, Duvivier, and Ponsolle, all of Paris. It is entitled "Certain Improvements in the Production of Typographical Etched Plates Reproducing Photographs from Nature or from Copy," and is described in the following specification:—

This invention relates to an improved process for obtaining typographic plates, reproducing photographs from nature, or from copies, with their mezzotints.

In carrying out this invention we proceed in the following manner:—We prepare, by the application of a layer or coating of the composition hereinafter described, a metal glass or ceramic plate, which, under the action of the light, receives the impression of a photographic plate; the image thus obtained transferred to the metal or other plate, as before mentioned, is submitted to the action of acids according to one of the usual and well-known processes, and the plate is then ready for printing.

The layer or coating hereinbefore referred to is composed of the following ingredients or others possessing equivalent properties in about the under-mentioned proportions, which may, however, be varied according to circumstances, and it is prepared in the following manner:—We steep in a porcelain or other vessel fifteen parts by weight of ambergelatine, three parts by weight of loaf sugar, and 125 parts by weight of distilled water; and we introduce into another vessel, composed, by preference, of glazed fireproof ware, three parts by weight of isinglass (first quality), and 175 parts by weight of distilled water. These two solutions are allowed to stand for (say) from ten to twenty hours in an atmosphere of a temperature of (say) about 3° Centigrade, after which the isinglass is boiled (whilst being kept stirred) on an open wood charcoal fire for (say) about twenty minutes, and placed aside, and the gelatine is dissolved with a water bath at a temperature as low as possible. To the gelatine solution is then added about four parts by weight of bichromate of potash, the mixture being well stirred in order to accelerate the solution and prevent cooling. The solution thus obtained is then added, whilst being stirred, to the isinglass solution in its vessel, and the whole is filtered through suitable flannel free from traces of soap, care being taken to accelerate the filtration by pressing the flannel, in order to cause the thickess portion of the composition to pass. This operation is performed over a glass having a spout or lip, and the mixture is then poured over an unpolished plate of copper, zinc, or plate glass.

The plate employed should be slightly warmed before the mixture is applied, and afterwards laid flat upon a marble in a stove maintained for about three hours at a temperature of (say) about 40° Centigrade, after which, when cooled, it may receive an impression by the action of light behind a photographic plate.

The process is then continued as for ordinary printing with fatty ink upon gelatine, employing transfer ink and transfer paper. The image obtained is then to be transferred to a plate of zinc, for example, and bitten in.

The grain obtained by means of this process enables a plate to be produced suitable for typographic printing.

The place in which all the hereinbefore described operations are to be performed must be maintained at a uniform temperature of (say) from about 25° to 30° Centigrade.

We are glad to find that the patentees had the good sense not to carry their invention beyond the provisional stage. Had they done so it would have been our duty to have indicated the number of times (if that were possible) the process has been brought before the readers of this Journal and the public at large.

M. Ernest Boivin has just completed in the *Moniteur* a series of articles upon gelatino-bromide which do not present any features of novelty for English readers. In the last number, however, he speaks of various physical defects in the gelatine film, and the methods of obviating them. Frilling of the edges, which he attributes to the use of unsuitable water for dissolving the pellicle, too slow drying of the film or over-heating of the emulsion or glass before coating, is cured in the first case by the addition of slight traces of alum or Epsom salts to the water employed (we presume) in moistening the film before development; in the other cases by removing the inducing cause. He further states that *ordinary* water only should be employed, distilled or rain water leading to failure. Blisters are prevented by adding "a few drops of solution of chrome alum" to the emulsion, or traces of tannin or alum to water used to soak the film before development. As regards the chrome-alum treatment the particulars are surprisingly vague; but it is possible that this very vagueness may account for the supposed advantage; or, in other words, that by using a sufficiently weak solution of chrome alum and a sufficiently limited number of drops no ill effect may accrue, while the faith of the operator leads him to imagine a beneficial action. In the course of a few experiments in this direction made some time ago we found that, if a sufficient proportion of chrome alum were used to produce an appreciable effect upon the solubility of the film after once drying, it was almost impossible to work the emulsion owing to the tendency to become lumpy, if not actually to gelatinise, unless the temperature were kept dangerously high for the production of perfect films in other respects; and that once developed this fault was irremediable. Infinitesimal proportions of the chrome alum, while not interfering with the fluidity of the emulsion nor with its solubility after gelatinisation or desiccation, worked most injuriously upon the structural character of films prepared from an emulsion which had been allowed to solidify and were re-liquefied by heat. Though the gelatine became perfectly fluid, the emulsion appeared to conglomerate into minute clots, which contributed a decidedly objectionable grain to the film when dried upon glass. For this reason we think the use of chrome alum is to be deprecated, except when facilities exist for preserving the emulsion at an uniform and sufficiently high temperature to retain it in a fluid state for any desired period, or where it is the practice to work up the whole quantity in one operation without permitting it to solidify.

RAISING THE FRONT OF THE CAMERA.

At last year's Technical Meeting of the South London Photographic Society I exhibited a camera having a movable front for raising the lens, and pointed out its many capabilities. As the makers of cameras have not taken advantage of the plan, I conceive it was not sufficiently seen at the meeting to be properly appreciated.

The invention is not my own, so I may therefore be excused for saying that it is, in my opinion, the very best method of raising the lens at present known. I enclose a small model, in case you should think it worth preparing from it a woodcut for your forthcoming Almanac.

Cameras are very frequently made square—thereby increasing considerably both bulk and weight—simply for the reason that when placed on their ends there is no method of raising the lens, and it is in that position it is most generally required for taking towers, steeples, and other lofty buildings. The fixed camera front has an aperture of the shape shown to enable the lens to traverse perpendicularly or horizontally, and two fixed screw bolts which pass through the L-shaped slots in the movable front carrying the lens, and which is fixed *in situ* by means of milled nuts.

I should not have brought forward this contrivance a second time, but it is really so simple and effectual that I should suppose no one who had ever tried it would think of adopting any other plan.

Baynham Jones.

ON THE RECTIFICATION OF SILVER BATHS, AND OTHER SUBJECTS.

[A communication to the South London Photographic Society.]

In the *Pharmaceutical Journal* of September 21 there is a paper, by Mr. W. C. Stables, treating upon permanganate of potash as a water purifier, and proceeding to point out that, although permanganate was very useful in getting rid of many organic compounds in water, its influence upon albumenoid compound was *nil*, and recommending hydrate of potassa as well as permanganate to purify water containing albumen.

Now, as it is very desirable in silver printing to keep the sensitising bath clean and as free as possible from albumen and other organic matter, I concluded to try the effect of Mr. Stables' solution upon my printing bath, and am much pleased with the results, the bath working like a new one after each clearing.

Having a small quantity of negative bath that would not work and an hour or two to spare I tried Mr. Stables' solution on it, and again met with success—such success, indeed, that when my working baths are in want of the "doctor" they have a dose of the following solution:—

Permanganate of potash	1 ounce.
Hydrate of potash	4 ounces.
Distilled water....................................	100 „

The application is the same as plain permanganate, viz., add until the colour is a permanent one.

What the reactions are I, of course, am not in a position to say, but if any photographer will kindly look up the article in the *Pharmaceutical Journal*, and give us the reactions, I as well as others will be grateful.

I have mentioned above some negative bath that would not work. Now that bath has been the cause of a great deal of anxiety to me and some loss of time. It was a new, specially-made bath for clouds and other pictures, and of course worked splendidly at first; but in a day or two *fog* set in, and the bath was neutralised, strengthened, and after the addition of a little acid was again in good working order. After the trial plate I could not use the bath for a fortnight on account of bad weather; judge, then, my surprise when, again trying a plate, I secured black, dirty, foggy pictures, instead of nice, clean ones as before. This was repeated twice more; then I thought something must be wrong, and at last pitched upon my ebonite dipper, which, although perfect below the water line, had the smooth skin peeled off above, and in my outdoor bath this bare part was below the solution when the top was screwed on, consequently the bath was fouled. The dipper was banished and the bath kept for experiment, as nothing seemed to make it come right until the present time, when it is working splendidly.

I myself shall not very likely have to use the solution again for the bath (except only for the purification of the water), as it is very seldom indeed my bath gets out of order sufficiently to require anything except *cyanide* and *sunning*, so I should like to hear from some one else how it works.

From the bath to the developer is but a natural step, and I again reiterate my partiality for collocine instead of acetic acid. I have tried experiments without number, but the result has always been the best from collocine. W. T. Wilkinson (Colombo).

NOTES ON PASSING EVENTS.*

By a Peripatetic Photographer.

Observing that the subject of the blistering of prints has been recently introduced upon several occasions, I beg to place on record a method of printing which gives immunity from this trouble—if one may be permitted to make such a bold statement on the strength of a trial of a few days. It consists in rinsing out the free nitrate of silver from the albumenised sheet, and subsequently sprinkling a little carbonate of ammonia over the pads of the printing-frame. This method of preparing paper for printing is already well known to the older and more experienced photographers; but my object in treating of it at present is to direct attention to the fact that a sample of paper addicted to blistering, when sensitised and made use of in the usual way, was quite free from this tendency after it had been subjected to the foregoing treatment. The method in detail is as follows:—After sensitising the paper the usual time draw it over the edge of the flat bath to get rid of as much silver solution as possible, and then float it upon a second bath containing water only, by which the bulk of the nitrate will be diluted and removed. It is then dried, and in this state it will retain its whiteness and purity for several weeks. To use it, all that is necessary is to impregnate the pads of the printing-frame with the vapour of ammonia. This may be done either by sprinkling a little ammonia (in the form of spray) upon the pads, by dusting over their backs a small pinch of carbonate of ammonia, or by placing the pads previous to their being put in use for the day in a close vessel or drawer containing ammoniacal fumes. Prints obtained upon paper thus prepared are very vigorous, and they tone to a rich colour.

The name of William H. Rulofson, of San Francisco, is well known all over the world, and photographers will hear of his sudden death with emotion. He lost his life by falling from the wall of his studio into the street below—a height of fifty-five feet. He was an artist of great taste and general ability, the business over which he presided being large and flourishing at the time of the sad and fatal accident.

Are photographers aware that the electric light can be produced without either a steam or a gas engine? Yet such is the case. It has been found that by the aid of a large flywheel, which can easily be driven by one man, a degree of rapidity and power can be obtained quite sufficient for utilisation in the production of the electric light. A large "machine" requires, of course, a powerful motor; but a machine of moderate power will suffice for the requirements of the photographer who desires to make use of it either in the production of portraits or enlargements. I am aware of a machine of this kind having been constructed by an amateur mechanician, and it answers well. What is now wanted is a machine of similar power, that can be obtained in the usual course of business at a moderate price—say for forty or fifty pounds, all complete.

Personal.—I, the "Peripatetic Photographer," feeling myself becoming lazy, have petitioned my good friends the Editors of this Journal to suspend the publication of these "Notes on Passing Events," which, with the exception of two paragraphs, have been regularly contributed by me every month during the past eleven and a-half years. The Editors permit me to be their mouthpiece on this occasion in informing the numerous readers of this Journal that these "Notes" by the "Peripatetic Photographer" will, with the commencement of the forthcoming volume for 1879, be succeeded by *Notes on Men and Things*, which will appear, with as much regularity as possible, on the first and third weeks of each month. Whether I "turn up" again under any other *nom-de-plume* or not is a matter of little concern at present; but as the "*Peripatetic Photographer*" I now take leave of numerous readers and many friends to whom in my assumed name I have not been unknown. I have only further

* Concluded from page 581.

to say that in these "Notes," while I have never omitted handling in the freest possible way such subjects as in my estimation deserved a little "touching up," I have ever endeavoured to do so in such a manner as to leave no sting of a personal nature behind. How far I have succeeded in doing so the readers can judge for themselves. It only now remains for me to say—*Farewell*, and subscribe myself, THE PERIPATETIC PHOTOGRAPHER.

NOTES FROM AMERICA.

KENT'S HAND-SCREEN.—RETOUCHING.

IN the *Philadelphia Photographer* Mr. E. J. Hough describes a visit paid by him to Mr. Kent, of Rochester, N.Y. He says:—

The point of most interest for me was his use of the celebrated "hand-screen." I saw him make five positions, using the hand-screen, as I understand he does with every subject for bust portraits, and in neither case did the movement of the screen over the sitters' heads exceed ten or twelve inches—just enough to slightly modify the toplight, shutting out or letting in a little more or less on either side. My misconception of its use was almost as great as that of the editor of an English journal who, in a recent article, described Mr. Kent as swinging his screen around his sitters' heads in a style quite likely to make them frightened and nervous. In speaking of how little its use was understood, I asked Mr. Kent if he had read the English editor's article. He said "Yes," laughingly, "and he must think I use it something like a windmill." I think the prevailing idea of it is something about as vague and wild, while in fact it is only a more convenient and controllable form of the old stationary head-screen; and the advantages sought and attained by its use are precisely the same—shutting out sharp high lights, and giving a softened and diffused effect to the light. Yet Mr. Kent's pictures have none of the flat look of pictures taken under an umbrella; they are full of detail in the lights and very transparent in the well-defined shadows. Mr. Kent makes his bust pictures mostly under the light, working the camera all round the room looking towards that centre. Four out of the five sittings I saw were made with the camera nearly facing the side light, the subjects sitting with their backs to the light, or nearly so. The side light was quite heavily screened although the day was cloudy, being covered up two-thirds its height with both white tissue-paper and white muslin. The exposures were somewhat prolonged—from thirty to forty seconds—with what must have been very sensitive plates, for the light was very subdued; yet the negatives were vigorous and full of printing quality. The hand-screen used was a thin, white muslin, about two feet at the widest, stretched over an egg- or pear-shaped willow hoop at the end of a light pole, about the length and weight of an ordinary jointed bass fishing-rod; in fact, I am now using my rod in that way, and it answers admirably. Having used it since my return to business I can confidently affirm that it is a very handy and useful implement for general use under the light, and almost indispensable for the best class of Rembrandtish effects. Its cost is almost nothing, and any one can make it; facility of using it is easily acquired, and the right to use it has, I believe, been freely given. I would, therefore, candidly advise every photographer who wants to increase his power of controlling the light to make one and try it.

Mr. E. H. Train, of Montana, in the same journal, makes the following observations on retouching:—

Now, we can make good negatives; but about retouching—"aye, there's the rub!" That takes long and careful practice to do it well; but a few hints may not be amiss here. Round up and smooth your negative nicely, being very careful always to preserve but beautify the likeness. Soften and blend, but do not obliterate, your shades. Look to the end of the nose. It usually wants some retouching, and is often overlooked; also to the eye, but here you must be very careful. In all your retouching strive to make it so fine that your prints do not show it.

ON PROCESSES OF MAP PRODUCTION BY PHOTOGRAPHY.*

PHOTOGRAPHIC ENGRAVING.

THE earliest practical process of photography was a method of photographic engraving invented by Nicéphore Niepce, and since his time nearly every great improvement in photography has been applied to this object. Thus, no sooner was the daguerreotype invented than essays were made by Fizeau, Donné, and others to engrave the images produced on the metal plates. In like manner the earliest application of the peculiar action of the alkaline bichromates upon colloid substances was Fox Talbot's photoglyptic process, which was soon followed by the photogalvanographic and helioplastic processes of Pretsch and Poitevin. Engraving processes have also been based upon Swan's pigment-printing process, the Woodburytype, and the collotype. With the exception, perhaps, of the second, all these methods, from the earliest to the latest, are in use at the present time in a more or less modified form.

* Continued from page 547.

The object of engraving maps upon copper is to obtain a plate taking but little storage room, and not liable to break, which shall yield a large number of impressions of uniform quality, and, with due precautions, be capable of being preserved in a good condition for printing during any length of time.

Copperplates have the further advantage that they may be multiplied to any extent by electrotyping, and corrections may be made when required, either on the original plate or on the electrotyped matrix or copy. Transfers may also be made from them to stone or zinc, and printed in the same way as ordinary lithographs. This procedure is specially applicable when very large numbers are required or when the subject is to be printed in colours.

Besides these more practical advantages, the superior beauty and finish of copperplate engraving give it the preference for all maps of a permanent or standard character.

With these objects in view nearly every civilised nation has at least one engraved map giving the results of the state surveys on a convenient scale for general use. For the same reasons map-publishers generally engrave the maps composing their atlases and other standard publications.

Notwithstanding its many advantages copperplate engraving is a very slow process and is also expensive, because the art of the engraver is one requiring great artistic and manipulative skill, only to be fully acquired by an almost life-long apprenticeship. Map-engraving, it is true, does not require so high a degree of artistic skill as line or aquatint engraving, but it nevertheless requires a long training, parcicularly in the more difficult branch of hill-etching, which demands almost as much skill to produce first-rate results as ordinary line-engraving.

Although the advantages of photographic engraving as a means of avoiding the long and costly labour of engraving maps by hand are obvious, for various reasons these processes have not yet come into general use. A successful commencement has, however, been made by the Italian and Austrian governments of employing photography in the production of their engraved maps, and there is little doubt that before long photographic engraving will be more extensively used for this purpose than it is at present, especially as processes are now available by which gradation of shade may be obtained without difficulty, and the expensive hand-work of the engraver in biting in or finishing may to a great extent be dispensed with.

The processes of photographic engraving that have been proposed from time to time for producing incised images on metal plates capable of being printed in the copperplate press are very numerous. I shall, however, confine myself to those which have been most successfully worked, and of which the details have been more or less fully published. Further information on the subject will be found in the special works referred to in the footnotes, and also in Hammann's *Des Arts Graphiques Destinés à Multiplier par l'Impression*, and A. Martin's *Handbuch der Email-photographie und der Phototypie order des Lichtdruckes*, which both give very complete *résumés* of the early progress in this branch of photography, with details of many of the processes. The photographic journals and the Patent Office records may also be consulted.

The principal methods of obtaining an incised image on a metal plate by means of photography are—

1. Obtaining a photographic image on a metal plate coated with asphaltum and then etching or "biting in" with acid.
2. Obtaining a photographic image in gelatine on a metal plate, and etching the latter with some substance that will not attack the gelatine.
3. Obtaining an image by the direct action of light on a metal plate, as in the daguerreotype process, then forming a metallic reserve to protect either the lights or shadows of the image, and etching with a suitable mordant.
4. Electrotyping from a relief obtained by the swelling or partial solution of a chromated gelatine film, either directly or by the intervention of a cast in wax or plaster.
5. Electrotyping from a relief in insoluble gelatine obtained in the same way as in the autotype or pigment-printing process.
6. Electrotyping from a leaden plate on which an image has been impressed from a gelatine relief, as in the Woodburytype process.
7. Electrotyping from a relief obtained directly on a collodion positive *cliché*.

It will be seen that these methods divide themselves into two principal groups of etching and electrotyping processes.

Etching Processes with Asphaltum.—We have already seen that Niepce, in his experiments to find a substitute for lithography, made use of the property possessed by bitumen of Judæa, or asphaltum, of becoming insoluble in oil of lavender and other solvents, after exposure to the action of light, to obtain photographic images on metal plates, which were then bitten in with acid, so as to form engraved plates, usually copies of engravings, though he also obtained images from nature.

Owing to the imperfection of photographic appliances in those early days of the art, the results obtained by Niepce could not have been very satisfactory; but with better appliances the same process has yielded in the hands of Niepce de St. Victor, the nephew of the inventor, Amand Durand, and others, results which prove its practicability and its capabilities for reproducing images direct from nature or for copying fine line engravings and similar subjects, for which latter it is much better adapted.*

A process on this principle has been very successfully used at the Imperial State Printing Office, Berlin, for the engraving of plates for bank notes and other purposes, and I have also tried it myself with fair success.

The following outline will give an idea of the operations:†—A perfectly smooth copperplate, having been thoroughly cleaned, and polished is coated with a solution of asphaltum in turpentine, to which a little oil of lemon is added. It is then carefully dried in the dark, so as to preserve an even coating, free from dust.

The image may be impressed upon the sensitive surface by sunprinting through an ordinary negative on glass; but as there is by this plan great risk of losing perfect sharpness by want of close contact between the glass and the copperplate, it is better to remove the collodion film from the negative and transfer it on to the surface of the asphaltum, so that it may be in absolute contact with it all over, and thus secure the utmost possible sharpness of the image. The collodion film is loosened from the glass in an acid bath, containing one part each of sulphuric and acetic acids in 320 parts of water, and the transfer is then effected in a bath of one part of glycerine and four parts of water. The transferred film being dry, the plate is ready to be exposed to light, and as the asphaltum is not very sensitive the exposure is somewhat long—extending from six to thirty-six hours; but it is better to over-expose and to work in diffused daylight rather than in the full sunshine.

When the plate is judged to have been sufficiently exposed, the collodion film is removed and the asphaltum surface is rubbed lightly with a tuft of cotton dipped in olive oil, to which after a short time a little turpentine is added. The image gradually begins to appear, and by degrees the unaltered asphaltum is all removed, so that the design appears in clear brown upon the polished copper. The plate is then washed with soap and water and allowed to dry.

The next operation is the etching or biting-in of the image. The back of the plate having been well coated with a thick varnish of asphaltum, to protect it from the action of the acid, the plate is plunged into a trough containing a mixture of one part of chlorate of potash, ten parts of muriatic acid, and forty-eight parts of water, and allowed to remain till the weakest lines of the drawing begin to appear. It is then well washed and the asphaltum covering the lines is removed with benzole. The design will now be seen standing in a slight relief, and an electrotype must be made in order to obtain a printing-plate, from which impressions may be taken in the ordinary way. The sharpness of the lines is better preserved by making a relief and electrotyping than it would be by biting-in.

The best results by this process are obtained from subjects in line, and even with these the operation of biting-in demands a little manipulative skill. Good results have, however, been obtained in reproducing half-tone subjects, but they require the greatest skill on the part of the operator, and generally much retouching by a practised engraver.

Etching Processes with Gelatine.—In 1852, Mr. Henry Fox Talbot brought forward a method of photographic engraving called "photoglyphy," which is of some interest as being the first practical photographic process founded on Ponton's discovery of the decomposition of bichromate of potash in contact with organic matter under the influence of light. Talbot found that by the action of light a dried film of gelatine mixed with an alkaline bichromate became impermeable to certain fluids in proportion to the intensity of the action of the light upon it. He coated steel plates with a thin film of gelatine and bichromate of potash, and after exposure to the light under a photographic positive he etched the image so produced with a solution of bichloride of platinum, which, penetrating the unaltered gelatine in the parts protected from the light and attacking the underlying metal, produced the shadows of the resulting picture. Some very promosing results were obtained in this manner, and great expectations were entertained of its utility in producing engraved plates for book illustration and other purposes. These hopes, however, have not been fulfilled, and the process, though remarkable as the first of the many valuable methods of photographic press-printing dependent on the use of gelatine and the alkaline bichromates, has inherent defects and difficulties which seem to render it of little practical value.‡

M. Baldus has successfully employed a modification of the photoglyphic process for line work.§ He coats a copperplate with gelatine and bichromate and exposes it under a negative or a positive, then etches in a solution of perchloride of iron, which attacks the copper in all the parts not acted upon by the light, and thus a first relief is obtained. As this relief is not sufficient, the plate is inked in with a printing roller, when the ink attaches itself to the parts in relief and protects them from the action of the etching liquid. This procedure is repeated till the desired effect is produced. If a negative be used an incised plate is obtained, which may be printed in the copperplate press. If a positive be used the image is in relief and suitable for being printed with type. I have found that the reliefs obtained in this way are exceedingly sharp, though the gelatine films will not stand the action of the etching fluid very long.

Messrs. Leitch and Co., of London, have lately introduced a similar process, called by them "photogravure." It appears to be due to M. Garnier, who has had great experience in these processes, and produced some very fine results. The method of working is a secret, but it is said that a metal plate is coated with a sensitive composition capable of resisting the action of acids. The photographic image is impressed on the sensitive surface through a negative, and is then etched with perchloride of iron. The etching is said to be to a certain extent automatic; that is to say, the etching action on the lines ceases at different periods in proportion to their fineness.

J. WATERHOUSE, *Capt.*

(To be continued.)

* See *Traité Pratique de Gravure Héliographique sur Acier et sur Verre*, par M. Niepce de St. Victor.

† Full details will be found in my *Report on the Cartographic Applications of Photography*, p. 79.

‡ A full description of Talbot's process, with specimens, will be found in the appendix to the English translation of Tissandier's *History and Handbook of Photography*, edited by J. Thomson.

§ See the above work, p. 207.

IMPORTANT LAW CASE.—DECISION.

THE nature of this suit, brought by Simon Wing, Albert S. Southworth, and Marcus Ormsbee, against Edward Anthony, Henry T. Anthony, and Vincent M. Wilcox, will be ascertained from the following:—

This suit is brought upon re-issued letters patent, No. 1,049, dated September 25th, 1860, to Albert S. Southworth, for "certain improvements in taking photographic impressions." The validity of this re-issued patent is denied for want of novelty in the original, and because it is for a different invention from that in the original. Infringement is also denied.

The patent has been held to be valid by Mr. Justice Clifford in Wing *v.* Richardson, 3 Fisher, 535, by Blanchford, J., following that decision as an authority, in Ormsbee *v.* Wood, 3 Fisher, 372, and by Shepley, J., in Wing *v.* Dunshee, district of Massachusetts, without delivering any opinion. And it has been held to be invalid by Mr. Justice Nelson in Wing *v.* Schoonmaker, 3 Fisher, 607, and by Withey, J., in Wing *v.* Tompkins, western district of Michigan. The decree of Mr. Justice Nelson was affirmed by the supreme court, equally divided, on appeal. It is understood that this decision of the supreme court was accompanied by a statement showing the manner in which it was made, that the question might be left open in other cases, and that decision did not appear to be an authority upon it either way. Durant *v.* Essex Company, 7 Wall, 107. In this state of the decisions upon this patent it seems necessary to examine this case in the light of the evidence in it and such recognised principles of law as appear to be applicable, however much easier and pleasanter it might be to follow implicitly one or the other of these decisions.

In the specification of the original patent the inventor said that the object of his invention was "to bring in rapid succession different parts of the same plate, or different plates of whatsoever material prepared for photographic purposes, into the centre of the field of the lens, for the purpose of either timing them differently, that the most perfect may be selected, or of taking different views of the same object with the least delay possible, or of taking stereoscopic pictures upon the same or different plates with one camera." That it consisted "of a peculiarly-arranged frame in which the plate-holder" was "permitted to slide, by which means" he was "enabled to take four daguerreotypes upon one plate and at one sitting, different portions of the plate being brought successively opposite an opening in the frame, the opening remaining stationary in the axis of the camera while the plate-holder and plate are moved." He then described the construction of the plate-holder by which a smaller frame holding the plate could be readily moved into and held in the four corners of a larger one, during the required space of time, by an ingeniously-constructed guide-piece designated L, and then stated that the "guide-piece, L, or some equivalent thereof is absolutely essential, as the attempt to hold the block, I," by which the smaller plate was moved, "by hand would shake the camera or move it from its normal position whilst the picture was being taken." The claim was for "the within-described plate-holder in combination with the frame in which it moves, constructed and operating in the manner and for the purpose substantially as herein set forth." In the specification of the re-issue the inventor stated that, in carrying out his invention, he had "made use of a peculiarly-arranged frame in which the plate-holder is permitted to slide, and in which the position of the plate holder is definitely indicated to the operator so that he can quickly and accurately adjust the plate or plates, and described the mechanism and construction substantially as in the original, and making the same statement as to the guide-piece being absolutely essential, and added—"It is evident that my improvement may be embodied by causing the lens of the camera to be made adjustable in different positions with respect to the plate while the plate remains stationary, so that different portions of the plate may be brought into the field of the lens. This I have tried, but do not consider it practically so good a plan as the foregoing, as it necessitates a change of the position of the camera itself or of the objects."

The claim was :—"What I claim as my invention and desire to secure by letters patent, is bringing the different portions of a single plate, or several smaller plates, successively into the field of the lens of the camera substantially in the manner and for the purpose specified."

It is quite obvious that the original patent was for the plate-holder of a camera, in its peculiar construction with its peculiar mechanism, and not for anything more. There was nothing whatever in it about moving the lens of the camera, or making it adjustable in different positions in respect to the plate, in order to accomplish the purposes of the invention. In the re-issue there are no means whatever described for adjustng the lens in different positions in respect to the plate, with the plate stationary, to bring different portions of the plate successively into the field of the lens. It is argued that bringing this subject of moving the lens into the re-issue constitutes a different invention from that in the original. If the mere statement here that it was evident that this might be done, without stating at all how, could be said to specify any manner of doing it, then the claim would include that manner, and the invention sought to be covered, as to so much, would be for what was not in the original, and essentially different from that, and the patent would be void. (Seymour *v.* Osborn, 11, Wall, 544); but whatever may have been intended by putting it in, this statement is not of anything essential to the invention, otherwise described, and describes nothing amounting to an invention by itself. It is not definite enough, so that it can fairly be said to add to or vary that with which it is put. It is said Mr. Justice Field, in Russell *v.* Dodge, 93, U.S. 460, that where a useful result is produced in any art, manufacture, or composition of matter by the use of certain means for which the inventor or discoverer obtains a patent, it is too plain for argument that the means described must be the essential and absolutely necessary means, and not mere adjuncts which may be used or abandoned at pleasure.

If the claim was for bringing different portions of plates successively into the field of the lens, without regard to the means by which it was done, as the central part of the film is mentioned in the original and not in the re-issue, the invention sought to be covered by the re-issue would then be broader than that in the original, and void, as that in Russell *v.* Dodge was held to be. But that does not seem to be the true construction of the claim. It is for so bringing the different portions of the plate into that field "substantially in the manner and for the purpose specified."

This is the same as if it had been for the manner or means specified of accomplishing that result, and it is for the means and not for the result. The means described must always bring the portions of the plates to be used into the central and best part of the field of the lens, the same as when described in the original; so that, in effect and in fact, the invention specified in the re-issue is the same as that specified in the original.

In taking pictures with a camera—theoretically, at least, and practically to a useful extent—probably the best are taken in the central portions of the field of the lens. If several are taken on the same plate they must be successively so taken in order to obtain the best results. This patentee may have discovered that they could be so taken, and would be better when so taken; but if he did, neither that principle nor the mere taking them so would be patentable, Boulton *v.* Bull, 2 H, Black, 463; Hornblower *v.* Boulton; 8 T. R. 95; Le Roy *v.* Tatham, 14 How. 166; O'Reilly *v.* Morse, 15 How. 62, although if the view of Mr. Justice Nelson in Le Roy *v.* Tatham, 185, "that where a person discovers a principle or property of nature, or where he conceives of a new application of a well-known principle or property of nature, and also of some mode of carrying it out into practice so as to produce or obtain a new and useful effect or result, he is entitled to protection against all other modes of carrying the same principle or property into practice for obtaining the same effect or result," had been adopted by the court, and this specification had not been limited, the patent might be held to cover that principle and the application of it. But that was not according to the opinion of the majority of the court in that case, and was not adopted then nor in O'Reilly *v.* Morse, in which the same question arose at the next term, when the same Justices, Nelson, Wayne, and Grier, dissented again, nor does it appear to have been adopted since. In the latter case Mr. Chief Justice Taney, at page 119, said :—"Whoever discovers that a certain useful result will be produced in any art, machine, manufacture, or composition of matter, by the use of certain means, is entitled to a patent for it; provided he specifies the means he uses in a manner so full and exact that any one skilled in the science to which it appertains can, by using the means he specifies, without any addition to or subtraction from them, produce precisely the result he describes. And if this cannot be done by the means he describes the patent is void. And if it can be done, then the patent confers on him the exclusive right to use the means he specifies to produce the result or effect he describes, and nothing more. And it makes no difference in this respect whether the effect is produced by chemical agency or combination; or by the application of discoveries or principles in natural philosophy, known or unknown before his invention; or by machinery acting altogether upon mechanical principles. In either case he must describe the manner and process as above mentioned, and the end it accomplishes. And any one may lawfully accomplish the same end without infringing the patent if he uses means substantially different from those described."

If the views of Mr. Justice Nelson had been adopted they would apply as he said, 14 How. 189, only to cases where "the inventor has not tied himself down in the specification to the particular mode described."

This patent seems to be limited carefully to the particular means specified in it for producing the desired result. In this respect it is quite different from that of Watt in Boulton *v.* Bull, and Hornblower *v.* Boulton. He describes his general method of arranging his engines without descending into particulars at all. In this the particular means are minutely pointed out. It is like that in Russell *v.* Dodge, which set forth a process of heating bark-tanned lamb or sheep-skins by means of a compound of which heated fat-liquor was an essential ingredient, and which was held not to cover the use of the same liquor, hot or cold, in the same manner otherwise. This view, that the scope of this patent is such that it covers only the means employed, is supported to some extent by the judgment of Mr. Justice Clifford in Wing *v.* Richardson.

The inventor himself has testified fully concerning the various steps by which he succeeded in accomplishing the invention patented. His testimony is corroborated by that of other persons, but is not essentially varied. According to it he conceived his idea of bringing different parts of the plate successively into the central and best part of the field of the lens when taking several pictures on the same plate, in 1846, and embodied it to some extent in the camera frame, which is exhibit 6, and the accompanying parts, which are exhibits 7, 8, 9, 10, and 11. But the method there adopted was very different from that described in this patent. That accomplished what it did accomplish by moving the lens with reference to the plate, not the plate with reference to the lens. In ascertaining the time of the invention the inquiry must necessarily be directed to the one patented. As to the time when that was perfected the inventor is directly inquired of at page 60, by cross interrogatory 36. When did you first devise and make an apparatus having the piece, L, described in your patent?

Ans.—I should say, in the first place, I know I made one in 1854; whether either of my sliding movements made previously had a stop that answers to piece L I cannot say. I know that there was one made in the autumn of 1854. I am sure I had a frame that had a guage or stop to it some time previous; whether it is possible to find that I do not know.

37. When did you first use in your business and when first sell an apparatus like that described in your re-issued letters patent?

Ans.—I cannot say when we first began to use it, but I judge about the time the patent was granted: not long previously. I think there were but two or three sold before 1859, 1860, or 1861; the exact time of these sales I cannot say.

He nowhere fixes the date any earlier, and the fall of 1854 seems to be the time the proof fixes upon as the date of this invention. This is according to the time found by Mr. Justice Nelson in Wing *v.* Schoonmaker.

If the patent was for taking several pictures on the same plate by bringing different portions of it into the field of the lens successively, the old and well-known method of doing that by swinging and tipping the camera would be an anticipation.

If it was for so taking pictures in the centre of the field it would be necessary to examine the proofs to ascertain whether, in the cases set up in the answer and claimed on the evidence, that method was known and practised prior to the discovery and use of it, by this inventor, in 1846. It might be difficult to find, by the requisite measure of proof, such use as would amount to an anticipation in this respect. If it was for a smaller plate-holder movable into the corners of a larger frame merely, it would clearly appear that several persons made use of that arrangement previous to the date of the patented invention in the fall of 1854. But the patent seems to include the arrangement of the guide-piece, L, in combination with a small plate-holder into the corners of a larger frame. This arrangement, taken altogether, appears to be substantially different from any other shown to have been made or in use prior to that time. This seems to be the effect of the testimony of the defendant's expert, Hicks, as well as the result of an examination of the testimony describing the various contrivances more or less relied upon, and the models and exhibits illustrating them. From these considerations the patent appears to me to be valid for that arrangement, and for that only.

There remains the question made as to whether the defendants infringe the patent, in its extent, according to this construction of it.

They have in their cameras smaller plate-holders movable into the corners of a larger frame substantially as described in the patent. But they are not shown to have the guide-piece, L, nor anything substantially like it, or substantially an equivalent for it. If the patent covered a sliding plate-holder moving into the corners of a larger frame as well as the guide-piece, the use of the former would be an infringement; but it does not. Such a plate-holder was old at the time of the invention. The patent is really for the method of moving the plate-holder and plate from corner to corner, and holding it in position there for the required length of time, without disturbing the camera as focussed; or the relative positions of the object to be pictured, the lens, and the opening to admit the image in the best part of the field of the lens in front of the plate. The inventor accomplished this by the

guide-piece, hinged to the larger frame, and controlling the movements of the smaller one within it. The defendants accomplish the same thing by another mode. In the language of Mr. Chief Justice Taney, before quoted, they use means substantially different from those described, and lawfully accomplish the same end without infringing the patent. Let a decree be entered dismissing the bill of complaint, with costs. (Signed) HOYT H. WHEELER.
—*Anthony's Photo. Bulletin.*

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE usual monthly meeting of this Society was held on Tuesday evening last, the 10th inst.—Mr. James Glaisher, F.R.S., President, in the chair.

The following gentlemen were elected members of the Society:—Messrs. Guttenburg, W. Hoar, Thos. Marsh, J. Milman Brown, Capt. Reeves, N. Broderick, Ezra Greaves, W. M. Harrison, and Alfred Pettitt.

A paper, *On a Really Reliable Emulsion Process*, was then read by Mr. Henry Cooper. Some observations on this will be found in another page.

The above was followed by a paper, by Mr. Leon Warnerke, *On a Case of the Destructian of the Latent Image on Washed Emulsion and its Restoration.*

In the absence of these papers from our columns the short discussion which followed could not well be understood. We therefore defer the publication of the discussion till next week, when the papers will also appear. It will be sufficient to here state that Captain Abney's remarks had reference to spots on emulsion plates, to the importance of making the emulsion with a hot solution of nitrate of silver, of the advantage of evaporating the solvents of the emulsion at a raised temperature, and of making use of lactic acid instead of the lactate of ammonia recommended by Mr. Cooper. Sulphite of soda was also recommended by Captain Abney as a preservative.

Mr. T. Sebastian Davis made allusion to his having, last year, in the course of experiments with bromide emulsion, used as a preservative that which he had formerly recommended in connection with the tourist's dry-plate process. It was rather interesting to notice the similarity between it and that in Mr. Cooper's process. He concluded with some observations on the mottling of the film in the high lights, on which subject Mr. William Bedford made a remark to the effect that mottling was solely owing to an unsuitable pyroxyline having been employed in the preparation of the emulsion.

Mr. WILLIAM WILLIS, Jun., then read a paper in which he described the reactions in, and process of printing by, his new platinum process. Having so recently given a full account of this process we shall assume our readers to be conversant with it, and hence shall not here anticipate by a recapitulation the publication of the paper next week. Mr. Willis demonstrated the working of the process and developed several specimens, the success of the whole being of such a marked character as to elicit the hearty applause of the members. Among other observations following the demonstration,

Mr. JABEZ HUGHES directed special attention to the fact that Mr. Willis had, since the original introduction of his platinotype process, made such decided and important advances as to have eliminated from it the necessity for using silver and its concomitant, hyposulphite of soda. These, he was happy to perceive, were now entirely discarded.

Mr. EDWIN COCKING then read a paper on *Subjective and Objective Photography*, which, with the other papers read, will also appear in our next number.

Votes of thanks were awarded to the authors of the various communications.

It was intimated that the next meeting would be held on January 14th, when Captain Abney would read a paper on *The Sensitiveness of Spots in Emulsions*, and Colonel Wortley would exhibit an instantaneous shutter.

The proceedings then terminated.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE annual meeting of this Society was held on Thursday, the 5th inst.,—Mr. P. Mawdsley, Vice-President, in the chair.

Messrs. E. Benthen and W. J. Anckorn Lowrie having been elected members, the Secretary read the following

ANNUAL REPORT.

YOUR Committee, in presenting the annual report of the South London Photographic Society for the session 1878, have reason to think that the amount of work done has been more than could have been expected, after taking into consideration the disturbing influences in political and commercial circles which have characterised the past year, and which, to some extent, must interfere with the careful consideration of scientific subjects, more especially as respects those who, whilst engaged in the daily routine of work, come forward voluntarily to supply subject matter for discussion at your monthly meetings.

Whilst all praise should be awarded to those few members who, by writing papers, have endeavoured to maintain the prestige of the Society, your Committee cannot but express a desire that others, and especially the new members who have hitherto not done anything in the same direction, should seriously try to commit to writing any thoughts that may arise whilst engaged in the practice of the art-science.

It frequently happens that in simple statements of any variation in what appear to be ordinary facts there lies concealed something which discussion often brings to the surface and throws a light upon, thus resulting in the communication of useful information, and for which your Society offers suitable facilities by its conversational mode of investigating details. It is hoped that the future will show that such opportunities have been taken advantage of.

Your Committee, in referring to the annual recurrence of the Technical Meeting, would wish to call attention to the fact that all your Society can do is to afford an opportunity (perfectly free) for new inventions and appliances to be published and explained; but the value of each Technical Meeting must depend upon the inventive power which has been at work since the previous meeting. Whether it be much or little, your Society, at the same time, deserves credit for giving inventors so desirable a privilege.

The opening meeting of the session was again devoted to a lantern exhibition, when readings were introduced for the first time—one from the *Pickwick Papers*, "Gabriel Grub," being given by Mr. S Statham, and a very dramatic reading of "Jane Conquest," by Miss Alice Burnelle.

The following papers have been read during the session:—*Educational Uses of Photography*, by Edwin Cocking; *On the Elimination of Soluble Salts from Gelatine Emulsions*, by F. Wratten; *The Use of Alcohol in Gelatino-Bromide Emulsions*, by E. W. Foxlee; *On the Reproduction and Enlargement of Negatives by the Collodio-Emulsion Process*, by W. Brooks; *Varieties*, by Edward Dunmore; *Photographic Experiences in Paris*, by F. York; *A Curious Incident in Connection with Paper Enlargements*, by F. A. Bridge; *Special Cotton for Making Pyroxyline*, by Leon Warnerke; *On the Rectification of Silver Baths*, by W. T. Wilkinson.

Photographs, apparatus, and appliances have been exhibited by the following gentlemen:—Messrs. W. M. Ayres, T. Avery, W. Atkins, C. Bennett, F. A. Bridge, W. Brooks, T. Bolas, W. Cobb, F. Cowan, A. Clarke, E. Dunmore, T. Harrison, T. G. Hemery, Baynham Jones, J. T. Lane, R. Kennett, Lieut. J. D. Lysaght, P. Mawdsley, J. Nesbitt, J. Penny, C. Smith, L. Warnerke, J. Werge, F. Wratten, W. Woodbury, and F. York.

In conclusion: your Committee hopes that the forthcoming session will be valuable from the subjects brought forward for consideration, and that the younger members of the profession will recognise the importance of giving material support to a Society which affords so pleasant a medium for the discussion and elucidation of all art and scientific matters connected with photography.

The report was unanimously adopted.

The Treasurer then submitted an interim report of the state of the finances of the Society, and it was agreed that the complete report be submitted early next year.

The following officers and committee were then elected:—*President:* Rev. F. F. Statham, M.A.—*Vice-Presidents:* Messrs. W. Brooks, E. Cocking, F. Howard, Jabez Hughes, P. Mawdsley, and G. W. Simpson.—*Committee:* Messrs. W. Adkins, T. Bolas, C. G. Cutchey, E. Dunmore, J. Nesbitt, L. Warnerke, and F. York.—*Treasurer:* F. A. Bridge, 9, Norfolk-road, Dalston-lane.—*Secretary:* H. Garrett Cocking, 7, Mount Eliot-terrace, High-road, Lee, S.E.

Votes of thanks were unanimously awarded to the retiring officers, especially to Mr. Edwin Cocking, the Honorary Secretary, for his valuable services during a number of years.

A paper by Mr. W. T. Wilkinson, of Ceylon, *On the Rectification of Silver Baths, and other Subjects* [see page 590], was then read; but, owing to the lateness of the hour, no discussion ensued.

The meeting was then adjourned.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE second ordinary meeting of this Society was held in 5, St. Andrew-square, on the evening of Wednesday, the 4th instant,—John Lessels, Esq., President, in the chair.

The minutes of the previous meeting having been read and approved, the following gentlemen were unanimously elected ordinary members:—Mr. G. W. Danter, Mr. John Hay, Mr. William Steaurt, Mr. John Reid, and Mr. James Dall.

The PRDSIDENT proposed that a presentation print be provided for the current year, and suggested that the subject should be chosen from nature.

The Treasurer (Mr. Alexander Mathison) having intimated that the funds would support the necessary expenditure, the matter was unanimously remitted to a small committee with full powers.

Mr. W. H. DAVIES next intimated the death of Mr. Carrick, an honorary member of the Society, and after a few appropriate remarks moved that expressions of sympathy be sent to his widow through the Corresponding Secretary of the Society. This was agreed to.

Mr. W. Neilson then read a paper entitled *Art in Landscapes*. This paper had been prepared for the forthcoming BRITISH JOURNAL PHOTOGRAPHIC ALMANAC and not for reading to the Society, but after some pressure Mr. Neilson had consented to read it on condition that a full report of it was not published. The paper was in the form of a dialogue intended to show (a) "art is not an imitation," and (b) "pictorial grandeur depends wholly on shade."

Dr. HUNTER said he had felt great pleasure in listening to such a poetically-expressed and practical paper. He considered that artists, as well as photographers, did not pay sufficient attention to the shades of their pictures. He also would particularly urge upon photographers the desirability of looking pre-eminently to the general form of their subjects, leaving the details to take care of themselves.

Mr. Denovan Adams remarked that artists endeavoured to put into their scenes not so much what they saw as what they *felt* to be there; they thus succeeded, more or less, in representing the emotions. He (Mr. Adams) considered the photographer to be so hampered by mechanical details that he would never attain to the production of pictures possessing the highest art qualities, and so would have to be content to rest within the more modest sphere of the possible.

Mr. J. Craig Christie believed the difference between an artist and a photographer to be—that an artist is able to give the sum total of his experience of nature, both past and present, while the photographer is bound to represent a phsae of nature only existing during a very limited period of time.

Mr. M. G. Dobbie moved a vote of thanks to Mr. W. Neilson for the very kind way in which he undertook to bring this paper before the Society, and which had led to such an interesting discussion. This was carried by acclamation.

Mr. Moncrieff (Secretary of the Society of Arts) exhibited a fine photographic copy of an old painting, showing the peculiarities of the German school as modified by Italian influence.

Mr. R. Murray, C.E., exhibited a large series of photographic views taken by the coffee process during the past season. They possessed considerable merit, the softness of the pictures being particularly noted, as also, in several instances, the happy selection of the point of view.

Mr. Neilson concluded his criticism of the series by remarking that he had often enjoyed coffee, but never more than he had that night while looking over these pictures.

Mr. J. M. Turnbull next exhibited Mr. Chadwick's oxygen generator, prefacing his illustrations with a short account of it, as gleaned from the published proceedings of the Manchester Photographic Society. The apparatus was an object of very marked interest, everyone present seeming anxious to see it in all its details, its extreme simplicity and freedom from danger being highly commended. Considerable surprise was also manifested by its decided economy over the old method, the evolution of gas being almost exactly equal to what it ought to be theoretically. The small cake of composition employed produced a cubic foot of oxygen in about seven minutes after the Bunsen flame was lighted, and that without any attention, trouble, dust, dirt, or annoyance of any kind whatsoever. A set of transparencies by Mr. York, illustrating the late Paris Exhibition, were thrown on the screen by the aid of this apparatus. It was suggested that a useful addition would be some simple means of working the generator when ordinary house gas was not available.

Votes of thanks to Messrs. Moncrieff, Murray, Turnbull, and to the President terminated the proceedings.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Society was held as usual at the Museum, Queen's-road, on Wednesday, the 4th instant,—Mr. E. Brightman in the chair.

The minutes having been read and passed, Messrs. R. Biggs and G. F. Powell, of Bath, were, on the motion of the Secretary, seconded by the Chairman, elected ordinary members.

The Hon. Secretary (Mr. H. A. H. Daniel) then handed round some samples and copies of price list of the "empire" opaque cloth for backgrounds made by Messrs. Avery and Co., of London. They were much admired, the texture being beautifully fine, and the colours chosen with great judgment.

The Chairman remarked that as the cloth was coloured on both sides it was a good plan that the manufacturers placed a different colour on each side, such as a medium dark one for three-quarter length figures and a light one for vignettes. He thought it capital material, as it could be washed.

Mr. Steevens remarked as to the inexpensiveness of the cloth.

Mr. Daniel introduced the subject of drying carbon tissue. He said that some few weeks back he prepared some 10 × 8 pieces, and hung them up in his laboratory to dry during the night, leaving his petrolene stove slightly burning to keep the air as dry as possible; the stove emitted no smell. After printing the next morning it was found utterly impossible to develope the tissue the ensuing evening. Fearing that the bichromate solution might have been acid he prepared some more sheets, sensitising with the Autotype Company's own powder dried in the same manner, and yet with the same result. Seeing the Editors of The British Journal of Photography had recommended drying by a petrolene stove, he wrote and stated his experience. In a recent number this was printed, the Editors saying they had used a petrolene lamp without the evil effects spoken of, and that they should like to hear of the matter being discussed. He (the Secretary) therefore brought it before the meeting.

The Chairman suggested that possibly some acid fumes might have existed in the operating-room at the time, and, if so, that would be a sufficient reason for the occurrence.

Mr. Steevens presumed that the Autotype Company used a different means of drying.

The Chairman replied that he believed revolving fans and other specially-constructed apparatus were used. He once was anxious to dry some sheets of carbon tissue by the next morning, and hung them near the ceiling of a room where gas had been burning all the evening, and shut the door. It was impossible to develope the pictures, the acid fumes of the gas rendering it quite insoluble. He now adopted the plan of using the kitchen grate, placing tissue on bamboo rods across it, letting the fire out, and using the heat from the iron plate at the top; in an hour or two it was quite dry.

Mr. T. Davey thought one of the "cherful" gas stoves would be a good thing to use for drying, the fumes being carried off by a small pipe at the back. The hot iron of the stove would be the means of doing this.

Mr. Daniel had some hot-water pipes passing through some rooms in his house, and he was making a drying cupboard to fit round them, with light-tight draught holes at top and bottom. This arrangement he hoped would be practically perfect.

Mr. Davey inquired whether those present had been satisfied with the past summer's experience in the working of the triangular-shaped black tent which the operator entirely entered, and which some of the members, like himself, had adopted.

The replies were in the affirmative, and

Mr. Daniel said that so far as he could see he should not work in a box-tent again. He considered, however, that the following improvements might be made, viz., that, instead of the present plan, short metal pins with cross swivel tops might be pushed into the ground through eyelet holes in the material at the base; and that, instead of the water bags which many used as tanks, a zinc tank with a cover should be used, as that could be filled from a stream at once. Filling water bags from a stream was not only a difficult but also a very time-wasting operation. The zinc tank would not occupy extra space in packing, as it could be made exactly the size to hold a plate-box.

Mr. Davey made some other suggestions as to head room and fixing the base in the tent in question.

Preparations were then made for carrying out one of the attractions of the evening, viz., the exhibition of Woodbury lantern slides. The lantern used was Newton's phantasmagoria lantern, and the new three-wick refulgent lamp.

Mr. Daniel said that he had had a communication from Messrs. Newton and Co. stating the result of their experiments since last season. They had constructed a three-wick lamp of great power and brilliancy. This lamp he had sent for, and they would use it for exhibiting the Woodbury slides. He had with Mr. Kitt, the Bristol Gas Company's engineer, tested the old two-wick and the new three-wick lamps most carefully, and found that the light of the former to the latter was as 45 was to 64½, which was a very great increase of illuminating power. This does not at all imply the candle-power of the light. The light was then turned on, and was much admired for its power and evenness.

The Chairman then exhibited a large number of slides of foreign scenery and characters, which fully maintained the reputation they have so deservedly gained. A few carbon tissue slides were also exhibited, and certainly proved the suitability of this process for making transparencies for the lantern.

Mr. Daniel said that the Autotype Company would be conferring a great boon on lantern exhibitors if they would not only supply a filtered black but also a filtered *purple* tissue for transparencies, as that colour was, so far, more harmonious and pleasing on the screen, the Woodbury slides always looking so agreeable in colour.

All the slides having been shown, votes of thanks to the Chairman and the Secretary were accorded, and the meeting was adjourned.

WEST RIDING OF YORKSHIRE PHOTOGRAPHIC SOCIETY.

The above Society held its annual meeting at the Oddfellows' Hall, Bradford, on Monday, the 5th ult.,—Mr. E. Greaves, President, in the chair. There was a fair attendance of members.

The Secretary read the following

ANNUAL REPORT.

The Council, in presenting this, the fourth Annual Report, have to congratulate the members upon the completion of another year's work. The Society still numerically advances, its numbers having considerably increased during the year, and few resignations have been received. We have to lament the death of Mr. E. L. Suddick, one of the oldest amateur photographers in the district.

The number of papers read has not been so large as in former sessions, but the Council hope to have more matter on hand for next year. The papers read have been as follow:—*On Secret Processes*, by Mr. Gregson *On Silver Waste*, by Mr. Garbutt. *Our Society*, by Mr. Crosthwaite. Several pieces of apparatus for facilitating oarbon printing have been exhibited by Mr. E. Greaves.

One outdoor meeting has been held at Bolton Abbey, where the Sheffield Photographic Society joined us, and an excellent day's pleasure was enjoyed.

The Council have once more to reiterate their wishes for more voluntary contributions to the Society's meetings. A paper produced from love of the subject and a desire to inform and benefit the members, is more valuable than one extracted only at the expense of much solicitation and entreaty. The old saw that "one volunteer is worth two pressed men" is as applicable to the peaceful art of literary composition and the conveyance of information as to the more violent arts of war.

In conclusion: the Council beg the members to bear the Society's interest at heart, to endeavour to develope the latent talent existing in our midst, to bring more personal feeling to bear upon the meetings, to provide more material for discussion, and in every way possible to add to the success of the Society.

The financial statement was presented by the Treasurer, and passed.

The election of officers for the ensuing session was then proceeded with, the President, Mr. E. Greaves, declining to fill the presidential seat for the next year. The result was as follows:—*President*: Mr. Jno. Howarth.—*Vice-President:* Mr. E. Wormald.—*Treasurer:* Mr. W. T. Burrow.—*Auditor:* Mr. A. Megson.—*Secretaries:* Mr. J. Crosthwaite and Mr. R. Holgate.—*Council:* Messrs. R. Broadhead, Gunstone, J. Smith, A. Sachs, E. Jenkins, E. Passingham, E. Greaves, W. E. Thompson, and J. Shaw.

The meeting was then adjourned.

THE annual *soirée* was held on Wednesday, the 27th ult., at the Market Tavern, Edwin-street, Bradford, at which there was a large attendance of ladies and gentlemen. Owing to the considerable cost which attended the exhibition of pictures last year the Council determined not to make any special effort in that direction on this occasion, but to reserve it for another year, when it is proposed to hold one on a more extensive scale. The number of pictures exhibited was therefore small, but of a very interesting character. To the tea, which was provided in admirable style by Mrs. Town, full justice was done by the assembled guests, after which the proceedings, under the able presidency of Mr. Howarth, took the form of social entertainment. Music, recitations, and dancing served to keep the company alive with enjoyment. Duetts were sung by Mrs. Crosthwaite and Miss Smith, Mr. Greaves and Mr. Kilner; songs by Mr. Burrow, Mr. Crosthwaite, and Mr. Hanson, and excellent recitations by Mrs. Illingworth and Mr. Howarth. The meeting broke up at a late hour, with good wishes for the Society's career and an earnestly-expressed hope of meeting again at the next annual gathering.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

THIS Society met on the 18th October, the chair being taken by the President, Dr. Vogel. He (the Chairman) laid upon the table a number of books and periodicals, amongst others a number of the *Patentblatt*, containing the report of a meeting of the recent International Patent Congress at Paris, where the subject of photographic copyright was considered, and at which the following opinions were expressed:—That photographs ought to be divided into two classes, namely, those of an artistic character and those having a purely trading value; and that the latter should be protected by a special law, while the former should come under the law of copyright as applied to works of art.

The Chairman remarked that it was gratifying to see the artistic value of photographs thus recognised, while the German Reichstag denied that photographs had any artistic value. He (the Chairman) then laid upon the table a copy of Husnik's work upon heliography, and a communication from Herr Schlösser, of Breslau, in which he gave an account of an exhibition of art-manufactures in that town, was read.

The new postal regulations were then discussed.

The CHAIRMAN presented a report on the Klary-Boissonnas' process in which he said he had arrived at the same conclusion as Mr. Rocher, viz., that by using it one gains a few seconds of time in the exposure, but that one loses in the quality of the negative.

Herren JACOBI and MARTIN said that some other photographers of their acquaintance had bought the process and had arrived at the same conclusions as Dr. Vogel.

Herr SELIGMANN had made a journey in Switzerland, taking with him some of Warnerke's and Wilde's emulsion plates, and some of Kennett's gelatine emulsion plates. He was most successful with the two latter.

Herr PRÜMM wished to know the percentage of really good plates which Herr Seligmann had obtained with the emulsion process as compared with the wet process.

Herr SELIGMANN replied that had he not made some mistakes in the management of the collodion emulsion plates he thought he should have been successful with about ninety per cent. of them. The gelatine plates had been nearly all successful. He could, however, make no comparison with the success of wet plates, as he had not used the latter on the particular excursion in question.

The CHAIRMAN, who had had considerable experience both with wet and dry plates, explained that he had found the percentage of failures about as great with the wet process as with a good dry process. Because, though the wet process itself was very reliable, still heat, dust, bad water, insects, light getting into the tent, &c., were great causes of failure which were absent from the dry process. He had once taken a bottle of emulsion with him on an excursion to the Baltic, prepared the plates in the evening, dried them for half-an-hour or so in the drying-box, exposed them the following day, and then developed them in the evening. Out of a dozen plates he had only *one* failure in consequence of faulty preparation. The other failures were caused by under-exposure, wind shaking the camera, &c.

The invitation from Herr Schwier, the President of the German Photographic Society, to join the latter body in holding a photographic congress at Dresden, in August, was then read, but the locality was not considered central enough.

The meeting was shortly thereafter adjourned.

THE Berlin Society met again on the 1st November,—Dr. Vogel occupying the chair.

A number of negatives on tissue paper, sent by Herr Sandtner, of Tetschen (Bohemia), were laid upon the table. The negatives looked very clean and dense, but the prints which accompanied them left a good deal to be desired. They were mostly reproductions. Herr Sandtner's object was to save the expense of glass negatives.

Dr. FRIEDLÄNDER, who had recently visited Herr Husnik, of Prague, said the process of the latter was suitable for pretty large negatives, and that equally good prints could be secured from either side of the negative.

The general impression of the members was that the process was better adapted for reproductions than for portraits.

Herr Hartmann exhibited a Klinkerfues' hygrometer, which was examined with great interest.

Herr Rückwardt showed two views, interiors of the dining-room of Herr Siemens' villa at Charlottenburg—one taken by daylight, the other by a mixture of daylight and electric light, both with an exposure of an hour and a-half. In the former those parts of the room which were not directly lighted appeared considerably under-exposed; while in the view taken with the aid of the electric light even the darkest parts of the room were shown in the most brilliant detail. Both pictures were taken with a pantascope. The electric light consisted of two flames, each equal to the light of 1,500 candles. An attempt to take the same view by electric light without any daylight failed completely. The electric lamps were used without reflectors.

Herr SELIGMANN thought it would be better to use a Ross's wide-angle symmetrical lens for photographing by electric light than a pantascope.

A discussion on Martini's new head-rest was followed by Dr. Vogel and Herr Schaarwächter's report on Dr. Richard's rapid process.

Dr. VOGEL had prepared some plates with his own preparations and some with those sent by Dr. Richard and had exposed a dozen of them, in pairs, in a stereo. portrait camera. The results were laid before the meeting. The exposure of one half of the plates was ten seconds, that of the other fifteen seconds. The result was that the plates prepared with Richard's chemicals were considerably denser in the lights than those prepared with Dr. Vogel's own chemicals, but they did not possess any more detail in the shadows than the latter. He (Dr. Vogel) also tried the double silvering, as recommended by Dr. Richard, and then the baths B and A, each by itself, but without any better results.

Herr SHAARWÄCHTER had also found greater density in the lights, but no greater sensitiveness in Dr. Richard's chemicals than in those in ordinary use.

Dr. VOGEL had communicated this result to Dr. Richard, who replied that probably the transport had had an unfavourable influence on the sensitiveness of the chemicals.

This explanation, Dr. Vogel thought, might not be improbable, but, if true, what a drawback to the usefulness of the process!

Herr SELIGMANN gave some further details as to his experiences with emulsion dry plates, and shortly afterwards the meeting was adjourned.

Correspondence.

THE "MANAGEMENT" AT THE RECENT PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—As the eight pictures I contributed to the recent Exhibition have mysteriously disappeared, and under peculiar circumstances, I shall be glad if you will allow me to state the facts of the case in the Journal, in the hope that some clue may be found as to their whereabouts.

As no packing-cases were allowed at the Gallery I sent my pictures to a friend in London, who unpacked and delivered them at the Gallery. My friend (Miss R.) was told nothing as to the fetching them away by the people at Pall Mall; but at the close of the Exhibition, of which I received no notice, I wrote to her asking her to call for the pictures and send them back to me. She thought they would not deliver them without a written order from me, and the posting of this order caused two days' delay. It thus happened it was not until the Thursday after the close of the Exhibition that the pictures were asked for. On application at the Gallery my friend was told all the unclaimed prints had been sent to Mr. Bourlet, of Nassau-street. On going to him nothing could be heard of the pictures, and after waiting until now for inquiries to be made, I have just received a letter from Miss R., in which she says —"I am so vexed about your pictures, but do not know what to do. They say at Pall Mall every picture was sent away the day after the Exhibition closed, and Mr. Bourlet, in Nassau-street, says he has never seen them." I understood the Exhibition closed on a Saturday, so by the "next day" I suppose they mean Monday.

I make no comments on the dreadful want of management shown by some one; but, as I cannot help thinking the pictures have been stolen, I should like to know who is responsible. Occurrences of this kind are not inducements to exhibit.—I am, yours, &c., HENRY COOPER.

Homehurst, Torquay, December 7, 1878.

CONTINENTAL PHOTOGRAPHIC LITERATURE.

To the EDITORS.

GENTLEMEN,—Having been enabled to hand over to a successor the direction of the photochromic works of the *Moniteur*, which absorbed the whole of my time, I am at last free to devote myself afresh to my experiments and photographic publications.

I have just undertaken to edit the whole of a series of distinct works on phototypy, photogravure, photoglyptie, photochromy, phototypography, photolithography, enamels, &c. I wish to communicate this fact to the *savants* and those who study or practice these various processes industrially in order that they may, if they think proper, assist me either in my judgment or in my work of popularisation by supplying me with any information they may desire to see figure in my various volumes. These volumes will form a grouped series under the collective title of *Annales de la Photographie*, and they will be edited and published separately, and as soon as they can be got ready, by the firm of Gauthier-Villars.

I shall be grateful, gentlemen, if you will give publicity to this letter in THE BRITISH JOURNAL OF PHOTOGRAPHY, as I am certain that it will thus be brought before the notice of all whom it may interest throughout the photographic world.—I am, yours, &c.,

28, *Rue Jacob, Paris, December* 6, 1878. LEON VIDAL.

THE *FIELD* ON THE SEA.

To the EDITORS.

GENTLEMEN,—In your issue of yesterday, on page 585, in an extract from the *Field*, it is said that painters err in painting large breakers immediately in the foregrounds of their pictures, in making *these* transparent instead of muddy, that they should begin to break out to sea and come inshore as foam, and that no large roller can exist in its perfect form close onshore.

In contradistinction to all this I beg to say that they can and do, for in bright and calm weather rollers six to ten feet high may be seen breaking at the very edge of the sea, so to speak. They may be noticed coming in and in, and then rolling over with a grand bang close to your feet, and are often wonderfully transparent and *not* muddy, as the *Field* would have us believe. Of course, when there is a heavy sea on the rollers do break out to sea and come in as foam, and after heavy seas the whole sea along shore is often brown, but not always. Let the *Field* stick to the "field," and not tell "crams" about the sea.—I am, yours, &c., FRANK M. SUTCLIFFE.

High Stakesby Cottage, Whitby, December 7, 1878.

P.S.—I also notice that the *Field* says that spring foliage is bright green. Surely the writer must be colour blind; it is often yellow and brown. Look at an oak, for instance, bursting into leaf.—F. M. S.

THE LUXOGRAPH.

To the EDITORS.

GENTLEMEN,—In reply to the inquiries of "Glasgowgian" in your issue of the 29th ult., permit us to supplement what you have said on the subject of the "luxograph."

Respecting the expense of fitting up the electric light, we believe that it will cost very little under three hundred pounds to have it fitted up properly. This, of course, includes the price of an engine. It is not for us to say how the Vanderweyde studio is succeeding; but from all we can learn its success at the present time is undoubted. Similar studios will soon be opened in connection with the luxograph.

With regard to the exposure required by the luxograph: we have obtained good negatives on gelatino-bromide plates in three seconds, although when working with wet collodion we prefer to and always give a much longer exposure—say fifteen to twenty seconds. In this time we obtain good negatives.

The "luxograph" and "photogene" are quite different instruments, both, however, having this point in common—that they may be used with pyrotechnic compounds; but they differ in this respect—that such compounds must be used in the one case, while in the other any powerful actinic light may be employed. Any further information we can supply to your correspondent is at his service.—We are, yours, &c.,

December 11, 1878. ALDER AND CLARKE.

THE RECENT MEDAL AWARDS.

To the EDITORS.

GENTLEMEN,—I forbear making any remarks as to Colonel Wortley's criticism of my seascapes, and wish to state that whatever my private opinion may be of the gallant Colonel's own work in this direction I do not elect to air them in a public journal.

A few words are, however, necessary respecting the particular copies he mentions, which were required for his "friend in the country," and about which he (Colonel Wortley) asks the aid of the Photographic Society of Great Britain. The prints were obtained in this wise:—A special messenger was sent down to my printing works in hot haste for a set of the photographs in question, with instructions to say they were for a "gentleman going to India," and unless they could be delivered immediately they would be of no use. In my absence my assistants sent him the only prints that were available, two or three of them being trial impressions as to whether double printing would improve them or otherwise. I heard nothing more of the prints until Colonel Wortley's name appeared in connection with them. I should, of course, have much preferred to have sent prints in every way similar had reasonable time been given for their production.

In conclusion: I may inform your readers that Colonel Wortley has really no *sole right* in the production of seascapes, and that any photographer is at liberty to produce them providing he has courage enough to submit them to the criticism of the gallant Colonel.—I am, yours, &c.,

December 9, 1878. PAYNE JENNINGS.

RECENT MEDAL AWARDS.

To the EDITORS.

GENTLEMEN,—As the "personal attack" alleged by Colonel Wortley to have been made upon him by me consists in a very mild criticism of one point in one of his pictures, I leave you to judge what importance I ought to attach to his deductions.—I am, yours, &c.,

Edinburgh, December 10, 1878. AULD REEKIE.

THE LATE MR. WILLIAM H. RULOFSON.—The late Mr. William H. Rulofson, for many years a leading photographer of this city, was almost instantly killed, about four o'clock yesterday afternoon, by accidentally falling from the fire-wall on the roof of his photograph building, on Sacramento-street, near the corner of Montgomery. It appears that he was standing on the fire-wall looking at some workmen who were lowering old lumber by means of a pulley, and while in that precarious position his foot slipped, and he instantly lost his balance and was precipitated to the sidewalk, a distance of about fifty-five feet. The building is four stories high, without awnings. He was heard to exclaim "I am killed" during the descent. He struck on a pile of tin, which arrested the force of the fall and prevented a mutilation of the body. He was taken up and removed to Burnett's drug store, and thence to the office of Dr. McNulty, his family physician, who pronounced him dead. The only external injury to the head was a bruise on the forehead. The ribs had been crushed by the fall. Mr. Rulofson was a native of Maine, and 52 years of age. His widow and several children survive him. He was a gentleman of pleasing manners, and highly esteemed by a large circle of private acquaintance. Professionally his standing was of the first rank. He had been a photographer in this city for over twenty years, during which time his efforts to improve his art were indefatigable and eminently successful. He was a member and promoter of the Photographic Society of the Pacific, and at one time was its President. No small part of his professional reputation was due to the artistic galleries of celebrities, which he cultivated with great care and taste. Few persons of note visiting this city were exempt from facing his cameras; and his photographs of that class became famous abroad and took prizes. He was intensely devoted to his art, but, in addition, he was fond of polite literature, and made some successful efforts in literary authorship. A work, entitled *The Dance of Death*, though its authorship was mooted, was generally ascribed to his pen.—*San Fransisco Alta.*

A NEW MADONNA.—On many of the boulevards, and on all the chief streets in Paris, are found pretty shops where they sell nothing but photographic pictures. During the exposition an unusual display is being made. Everybody finds pleasure in examining the attractive exhibits found in these shop windows. Throngs are about them all the afternoons and during the evenings, as they light up brilliantly real crowds. Such artistic pictures of actresses! Such clear and sharp pictures of the wonderful buildings in the public squares, and such views of the exposition! Just out of the Rue De l'Opera, in the Boulevard Des Italiens, is one of these picture stores. We often looked in the windows, and one day saw, oh! such a face! 'Twas that of a Madonna. Everybody looked at it and spoke about it. The dearest cabinet photograph sold in Europe is that of Queen Victoria, taken by Bergamasco; price, 75 cents, everywhere the same. The price of this Madonna was 90 cents. It seemed like a familiar face—a photograph we had seen in New York; but it was on a card with the name and address of this Paris establishment. Several Americans had been heard to exclaim as in the crowd we looked and admired together, "Oh, *that's* a picture;" "Oh, what a photograph that is!" "Ah! if our American photographers could only take such pictures!" "Did you ever see anything anywhere so fine?" One day, after hearing these expressions for the hundredth time, making up our minds to "*see*" about that, we went into the shop and said—"Now be frank about that photograph. Is it not made in the United States?" The Frenchman answered—"Oh, Monsieur, he is such bootiful piczure." "Ze artists he raves; oh, ze bootiful Madon!" "But isn't it made in the United States? And didn't you get it through Anthony's? And isn't it one of Sarony's?" "Let me assure you, Monsieur, it is ze finest photograph in ze world!" and then the fellow went into a dozen exclamations as to the perfection of the artistic effect, the light, the shade. It took a long time, but to persistent questioning at last he said—"We, we, Monsieur; he is Sarony!" "He is Anthony!" To get "*good* photographs," however, you must go to Paris (?); and "if American artists only *could* take *such* pictures" it would be so much *more* to our credit (?). The face was that of Maud Branscombe, and the photographer was Sarony, of Union-square. Look out for pictures taken over unmounted or stripped from the home card and remounted again. Beware of *artistic* photography in Paris.—*Anthony's Bulletin.*

EXCHANGE COLUMN.

ANSWERS TO CORRESPONDENTS.

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

Fabronius.—There is no copyright in the name.

F. L. C.—Three and a-half feet of opaque covering over the sitter's head will be quite sufficient.

T. Lewis.—The subject is alluded to in several manuals, but there is none devoted to it exclusively.

H. G. G.—M. Despaquis, of Paris, is the patentee. On the merits of the invention we are not in a position to speak.

S. P. L.—Your chrome alum has not behaved in an exceptional manner. The colour, although blue when the solution is cold, becomes green when heat is applied.

Alpha.—Seeing you have tried all the other methods that have been proposed, why not devote a few hours to that in which alum is alleged to be an element of success?

D. W. (Leith).—A tall figure may be obtained in even your low studio by suspending, at a little distance in front of and overhead the sitter, a cloth which when photographed will be of the same colour as the background.

A. B. C.—The process of silvering glass globes, similar to the sample enclosed, is a secret one. We hope, however, to obtain some information concerning it, and, if we are so fortunate, shall publish it under the initials at the head of this answer.

J. W. B.—We have made inquiry respecting the standing and general character of the firm named, and the report is highly favourable. Should you not hear from them in course of a few days, we can, if you prefer it, submit your letter to the principal.

The Luxograph.—Just before going to press we have received a letter from Mr. Robert Faulkner, in which he says that a statement in Signor Lombardi's "testimonial" advertised in our issue of last week is incorrect, so far as Mr. Faulkner's immediate intention is concerned.

Thomas Tulloch.—Strain tightly the fabric which is to form the background, and give it a coating of weak size. Next apply a powder composed of burnt umber and lampblack or other pigment, using for this purpose a soft pad. When the desired effect has been produced the spray of water, judiciously applied, will suffice to fix the colour.

Geo. Beck.—Both of the lenses named are perfect in the sense of producing pictures free from distortion. But one of them—that having the shorter focus—must be used with a *small* diaphragm, otherwise the definition, both in the centre and all over the field, will be defective.

R. C. M.—On the principle that "desperate diseases require desperate remedies," we suggest that you give your bath a dose of cyanide of potassium, seeing that all other means of rectifying it have failed. We have known a similar case cured by the addition of a weak solution of permanganate of poaash. See, also, a paper by Mr. W. T. Wilkinson in the present number.

F. Smith Bell.—The markings on the plates are evidently owing to their having been rested, whilst wet, upon a bare shelf or other non-absorbent surface. In future let your shelf be prepared by being first of all thoroughly well scrubbed, and then covered from end to end with three or four thicknesses of blotting-paper. This will absorb all the drainage from the surface, and keep the plates clean.

Rev. F——.—Far better will it be to have a divided rule placed on the baseboard, and have it graduated to tenth parts of an inch. Let there be an index point or finger outside the sliding back of the camera and corresponding with the plane of the ground glass. By having such an arrangement as that described, and aided by the tables of enlargement and reduction to be found in our Almanac, your further proceedings will be rendered quite easy.

G. S. J. G.—The greasiness of the surface of the albumenised paper print may be effectually obviated by applying your tongue to it.

A Printer.—A mixture of chloride of platinum, essence of lavender, litharge, and borate of lead is said to be that employed in the platinising of glass. We are not aware of the best proportions, but we know that the mixture is applied to the surface of the glass by means of a camel's-hair brush, after which the plate of glass is heated in a muffle, with the result that the surface treated in the manner described becomes quite resplendent.

Subaltern.—The best process by which to take the series of pictures mentioned in your second note is the "moist" process of the late Mr. Sutton. So far as we are able to speak from experience it will answer admirably when used uuder the circumstances described. The process, in brief, consists in adding an extra grain or two of bromide to any ordinary collodion, sensitising the plate in the usual nitrate of silver bath. After undergoing a washing the plate is then coated with a mixture of albumen, glycerine, and water. Plates prepared in this manner remain good for a whole day. In reply to the query in your former note: a photometer of the nature suggested has already been tried, but up to the present time it has not proved successful. It would, doubtless, be highly convenient if the actinic power of the light could be ascertained by means of instruments having an index similar to those of the thermometer and barometer; but such an instrument has not yet been successfully introduced.

Death of an Amateur.—We much regret to announce the sad death of Mr. Frederick Gye, which took place on the 4th inst., at Dytchley Park, Charlbury, Oxfordshire. The deceased gentleman was on a visit to Viscount Dillon, and while out shooting with a party of friends was accidentally shot in the groin, from the effect of which, after a few days' suffering, he succumbed. It is scarcely necessary to say that Mr. Gye was proprietor and director of the Royal Italian Opera, Covent Garden, where for nearly thirty years he was so well known for the liberal and splendid manner he produced many new operas to the English lovers of music, that any details of Mr. Gye's management as *impresario* of that great lyric temple would be here out of place. In Mr. Gye's death we lament the loss of one of the early amateur photographers. Many years ago he was most successful in the production of stereoscopic glass positives, for delicacy of detail in which we seldom ever saw anything to equal, and up to a recent date he was a warm patron of any high-class photographic work. The funeral of Mr. Gye took place on Monday last at Norwood Cemetery, the ceremony being one of quite a private character. We simply add that the deceased was universally respected by all who knew him, and his loss will be deeply regretted for many years to come.

Photography in Court: A Faded Photograph.—Larkin *v.* Suchbery.—This was a claim heard in the Clerkenwell county court before Mr. Judge Whitbread, in which the plaintiff, a private gentleman and a yacht owner, sued the defendant, a photographer in Canonbury, to recover the sum of £5, being for money paid to defendant for a marine photograph. The plaintiff said that on the representation of the defendant he gave him instructions to execute a photograph of his yacht, and to go to her moorings for that purpose, and that on receiving a proof of the photograph he paid the defendant the sum agreed upon, and had the photograph framed and hung in his yacht; but the plaintiff subsequently discovered that the photograph had become so obliterated as to be perfectly indistinct, and under these circumstances he had applied to the defendant to return the money he had received, as, in fact, the photograph was perfectly worthless. The defendant in reply said that the fault was not attributable to himself, as the photograph was carefully mounted, well washed, and could not have faded, and if it had been properly framed the action of the sea air would not have affected it. At this stage of the case the learned judge considered that a delicate photograph would be materially injured by exposure to sea air unless properly framed and protected, and as the plaintiff did not appear to have done this judgment would be entered for the defendant with costs.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For the Week ending December 11, 1878.
These Observations are Taken at 8.30 a.m.

Dec.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
5	30·10	—	45	35	37	39	W	Foggy
6	30·08	—	38	29	30	33	N	Fine
7	29·66	—	42	30	32	33	NE	Overcast
9	29·63	—	36	30	—	32	NW	Foggy
10	29·81	—	31	27	—	30	N	Foggy
11	29·89	—	—	26	—	31	NW	Foggy

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THE BRITISH
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PERSONAL.—EDITORIAL CHANGES.

Seldom indeed, in these pages, has any editorial announcement been made in the first person singular. It is believed, however, that the intimation now to be given may fitly assume that form.

After having for nearly fifteen years occupied the well-known "old arm chair" in the editorial *sanctum* of The British Journal of Photography, the connection thus intimately established between the readers, the proprietor, and myself is about to be severed; for with the last number to be issued this month I retire from my editorial position, during the tenure of which I have secured many valuable friendships. I wish cordially to acknowledge the numerous courtesies I have received, and which I have ever endeavoured to reciprocate, although from the exceedingly heavy correspondence to which I have had to attend, as indicated only to a small extent by a perusal of the "Answers'" page in each number, some may have unintentionally been overlooked.

With respect to my successor, the position of editor-in-chief will be occupied by Mr. W. B. Bolton, of Liverpool—a gentleman whose intimate connection with emulsion photography will secure for him universal respect. Not merely as the initiator of the now generally-practised washed emulsion process, and in a less-exclusively individual sense of the original collodio-bromide process, but also as a lucid writer and intelligent experimentalist, Mr. Bolton is already well and favourably known to the readers of this Journal. I wish, therefore, to bespeak for my immediate successor a continuation of those courteous attentions of which I have been the recipient. Mr. Bolton will be assisted in his editorial work by those able writers, on every phase of photographic art-science, who have for such a lengthened period aided the chief editor in rendering The British Journal of Photography worthy of the high position which it has so successfully aimed at securing.

It is, perhaps, wrong to speak, as I have done, of my *severance* from this Journal, for it is far from being improbable that its readers will frequently hear from me shortly after the commencement of the new year, when I shall have settled down in my new home in the chief city of the United States of America.

J. Traill Taylor.

ON MOTTLING AND ITS CAUSES.

In the course of the discussion which followed the reading of Mr. Henry Cooper's paper, at the last meeting of the Photographic Society of Great Britain, the question of "mottling" was introduced, and Mr. William Bedford expressed the opinion that the defect arose solely from the employment of an unsuitable pyroxyline. It seems to us, however, that there are two distinct forms of mottling—not perhaps very easily distinguishable by their mere appearance, but readily so if the conditions under which they are developed be taken into consideration.

We agree so far with Mr. Bedford in his view that we are prepared to place an unsuitable pyroxyline in the foremost place amongst the causes which induce mottling; but, at the same time, it can scarcely be denied that the defect frequently makes its appearance under circumstances which preclude all possibility of laying the blame to that cause. When such is the case the origin of the fault is nearly always traceable to purely physical causes—such as too thick an emulsion, the presence of too much water in the solvents, or an excessively high temperature at the time of coating the plate. When, therefore, the defect makes its appearance under any of these conditions it will be advisable, before completely condemning the emulsion itself, to make a searching inquiry into the whole of the circumstances, with a view, if possible, of reaching the true seat of the evil; and for this purpose the nature of the mottling forms a tolerably good guide.

If the result arise from a too thick emulsion the markings will be large in size, and will have the character of waves or streaks running somewhat in the direction in which the emulsion is poured off the plate. The excessive thickness of the emulsion may arise from different causes. It may be due to too great a quantity of pyroxyline in proportion to the bromide, or *vice versâ;* or, those two constituents being in correct proportion, the quantity of solvents may be too small, as in the case of an emulsion which has been employed for coating a number of plates, without any addition of fresh ether and alcohol to replace that lost by evaporation.

When the pyroxyline is in undue excess of the bromide it becomes necessary, in order to obtain a sufficiently dense film, to form a thick coating by reducing the solvents to the lowest possible limit; but the sort of marking which results from this course can scarcely be classed under the head of "mottling," as it partakes more of the character of "crapiness" of a very pronounced description. Under the reverse conditions irregularities in the film are scarcely of the nature of mottling; and as this phase of the evil is not likely to be of very common occurrence under ordinary circumstances we need scarcely dwell upon it here.

The first type of mottling, then, may be considered to arise either from dissolving too large a portion of "pellicle" in a given quantity of solvents, or from using the same emulsion for a large number of plates without "thinning" it by the addition of ether and alcohol to replace that lost by evaporation. The next form of the defect caused by weak solvents is similar in physical characteristics to the first, the markings being large and distinct, but partaking less of the character of streaks. It is, however, distinguishable from the first-named by the peculiar glassy appearance of the surface of the film when "set," and by a tendency to further irregularities in drying.

When mottling occurs from too high a temperature in the operating room it is of an entirely different kind. The individual markings are smaller in size, and approach more closely to a circular shape; they are frequently also spread unevenly over the surface of the plate, one end of which may be perfectly clear, while the other (that at which the emulsion is poured off) is entirely covered with them. Working under such unfavourable conditions as regards temperature, the most perfect emulsion will frequently prove incapable of forming an even film; but, if other predisposing causes exist, it will be found absolutely hopeless to attempt the preparation of plates without resorting to some means of cooling the atmosphere.

When mottling arises from physical causes the results are, to some extent, remediable; but such is not the case when the pyroxyline is at fault, as by no amount of care in coating the plate, nor by any modification in the proportions of the different constituents of the emulsion, can the irregularities and imperfections of the film be avoided. It is, therefore, desirable to consider what are the conditions which lead to the production of this objectionable description of pyroxyline. For emulsion purposes—especially since the introduction of washed emulsions—the chief aim in the preparation of pyroxyline has been the formation of a product capable of rendering density and of resisting the washing or precipitation which the emulsion has to undergo previous to re-solution. The difficulty consists, not in securing density and resistent power, but in combining those properties with others of equal importance, and which require a different course of treatment for their production. Thus it is a matter of the greatest ease to produce a sample of pyroxyline capable of forming images of the greatest possible density, but wholly useless on account of structural defects; and, as we have had some experience in this direction, we propose to mention briefly the causes which operate, in the preparation of pyroxyline, in producing mottling and other similar defects in the finished film.

First, we will speak of the temperature of the acids. In the preparation of cotton for ordinary collodion purposes—that is, for use in connection with the bath—a high temperature produces a fluent, structureless collodion; and the same rule holds good, to a certain extent, when the pyroxyline is intended for emulsion purposes. If, however, the temperature, taken in connection with other circumstances, be too high the result is that the collodion—or, rather, the emulsion—possesses excellent flowing properties, but exhibits an apparent incapacity to carry the suspended bromide evenly over the plate. Thus: we coat a plate with an emulsion of this description, and upon pouring off the surplus we probably have a beautifully-even film; but, on the point of setting, as it were, the evenness suddenly gives place to a regular series of fine mottled markings, differing most completely from the appearance described in connection with mottling from physical causes, and answering, probably, to the defect designated by Mr. H. Manfield "flocculence."

High temperature alone, however, does not produce this result, but only in connection with some other variation from the normal conditions observed with regard to the mixed acids. The proportion of water present in the acids, on the other hand, seems to work independently of other conditions, and quite irrespective of the temperature, producing a marked effect upon the character of the resulting pyroxyline. In proportion as the quantity of water is reduced beyond certain bounds (dependent, of course, upon the raw material to be operated upon), so does the tendency to mottling, as well as other forms of marking, increase, and this is the direction in which, we believe, the gravest errors are made. With a view of securing the greatest amount of density the temperature of the acid mixture is raised to the utmost limit, and then, in order to avoid solution of the cotton, the *strength* is also raised; hence the trouble.

Our observations are chiefly based upon experiments made with paper and linen, though we have noticed the same results when working upon cotton. With the former class of substance we have found it extremely easy to produce a collodion possessing any degree of density combined with sensitiveness, but failing in the one quality—evenness of film; and in nearly every such instance we have been able to lay the blame to an insufficient proportion of water in the acids.

VARIETIES OF TONE.

Last week we dealt with the æsthetic bearing of the various "tones" in which photographs are printed, deferring to the present time the discussion of practical modes of bringing about these desirable varieties.

Naturally carbon printing first presents itself for notice, though the work for the operator in producing the desired result is practically *nil*, seeing that the manufacturer does for him all the mechanical part, the duty of selection alone belonging to the former. It is possible now to purchase not merely a few well-marked colours, but also—to assimilate their appearance as much as possible to silver prints—a considerable number of tissues of a brown or purple character, all varying slightly but each possessing marked characteristics. We have already alluded to a red tissue made similar in colour to the red chalk of the draughtsman. There are also sepia and other similar colours to be had, and there are few which, if they are required, cannot be produced. This is not the occasion to enter into a disquisition as to their qualities in the direction of permanence, but there is no doubt that the fullest necessary information will be freely given on any required point by the manufacturers.

The treatment by the printer of any given tissue has no practical effect upon the colour—hence, as we have said, his share in the toning is merely selection; but if for any special purpose he wishes to make a difference in the colour of a given picture it is open to him to do so by dyeing the print afterwards, the gelatine of the print lending itself in a very easy manner to tinctorial treatment by a variety of substances—the aniline dyes in particular, which may now be purchased very readily, either in solution or crystals.

The toning process, *par excellence*, however, is the time-honoured treatment by gold of a silver print—an almost inexhaustible topic. The present taste of photographers seems to be decidedly for a brown, as rich as possible, and inclining rather to yellow than to red. There are many causes for this preference, the main one, we believe, being this—the use of heat in hot-pressing, by burnisher or otherwise, which, as we have on a former occasion pointed out, has the effect of increasing the brilliance and depth of the shadows to a most exalted degree, the colour at the same time changing in the direction of a brown, a rich burnished print of a purplish-brown tone being rarely seen. No existing process gives the excessive beauty and transparency of the darks that hot burnishing or pressing produces, and it is obvious that such most desirable qualities should determine the tone to be aimed at in many instances.

The production of a brown tone, when first it became a fashion a number of years ago, was aided by the introduction of a special paper salted with a barium salt, which has the character of limiting the range of colour to the region of reds and browns, any attempt to force a good purplish tint with it being unsuccessful.

Earlier in the days of our art chloride of sodium was the chief salting material, and with that, too, the range was limited and outside of the bluish colours, the introduction, at a later day, of chloride of ammonium being one of the most striking of those many apparent insignificant changes in modes of working which have wrought such important improvements in the general character of photographic work. With an ammonium-salted paper the richest purples, almost approaching to black, may be obtained, while the browns also are within its capabilities; but not, we are bound to say, with such thorough success as the papers specially prepared for those colours.

Turning now from the make of the paper to the gold bath: we find we have in our hands still further powers of stamping a distinctive character upon our prints by varying its composition. Carbonate of soda and gold was the first formula published as the alkaline gold toning; this was quickly followed by one which substituted phosphate of soda for the carbonate; and after that nearly every salt under the sun has been tried and recommended. In common practice, however, the carbonate, phosphate, and acetate of soda, and the so-called chloride of lime, are employed almost to the entire exclusion of any other. For quickly-extemporised baths, capable of producing most varieties of colour, the carbonate is a general favourite; but the colour it produces is rather rawer in character than the others give, and the bath does not retain its properties unaltered for many hours—in fact, if not specially acidified after use it shortly ceases to be able to tone.

Phosphate of soda is very similar in action to carbonate, giving rather more delicate colours; but it also is liable to quick change, though not so quick as the carbonate. Biborate of soda, or borax, enables a particularly blue hue to be produced—one not to be recommended for general use, but perhaps useful in special cases.

The favourite salt of all is, however, the acetate of soda. With it every tone from brown to purple can be obtained, and of such a soft and delicate character as to thoroughly deserve the general favour with which it is regarded. There is scarcely any feat in gold toning which cannot be performed upon an albumenised paper print with the acetate of soda gold bath. The solution keeps for weeks—we might say months—in good and even working order, and is freer than any other from the many difficulties of mealiness, uneven toning, &c., &c., so often a nuisance to amateurs and professionals in printing operations.

There remains to be noticed the chloride of lime bath. We may here, *par parenthese*, note that "bleaching powder" is the best name for this substance, the term "chloride of lime" being a chemical absurdity. Chloride of calcium is another substance altogether; although, through these improperly-selected terms, confusion has often been caused with regard to this particular bath. Its properties are to give a rich blue or black, such as cannot be obtained fully with any of the before-named substances, and for those who like to give this tone to their prints it is invaluable. When carefully worked, and not made too strong, it gives a delicacy and an engraving-like appearance which no other toning bath known can rival. In its tone it is most like the beautiful colours of Mr. Willis's platinum process, which, upon plain unglossed paper, surpass anything else in the region of photographic "tones."

THE "CONTINUATING ACTION" OF LIGHT APPLIED TO CARBON PRINTING.

Since the commencement of the present month residents in the metropolis have had no occasion to be reminded that the proverbial "dark days before Christmas" have already put in an appearance; especially will this be the case when they read the Astronomer-Royal's report, which shows that the actual duration of registered sunshine in London during the first seven days of December was less than three and a-half hours, or about six per cent. only of its possible duration. We have reason to believe that many provincial towns have not fared much better as respects weather than has the metropolis. One of the first to experience inconvenience from such a state of the light is the photographer; for, not only is it impossible for him to produce negatives, but he is also unable to execute such orders as he may have for prints. He may put out his frames day after day, but the number of prints obtained will be far short of his requirements; and he frequently finds that after a print has been exposed for two, or even three, days he is compelled to destroy it owing to the discolouring of the paper. Especially is this the case with vignettes, thus entailing considerable loss not only in time but in material. It is true that he may, to some extent, ameliorate matters by using permanent sensitised paper, which is not so liable to change colour in the frame, and is generally more sensitive than that in ordinary use; and he may, to some extent, increase the sensitiveness of his ordinary paper by more heavily salting and sensitising it on a stronger bath. Fuming with ammonia also increases the sensitiveness. But with all that he can do he cannot effect much in shortening the exposure.

In these remarks we have only referred to silver prints; but, as we shall presently show, the carbon printer has many advantages over his argentic *confrère,* inasmuch as carbon tissue is much more sensitive than silver paper, and only requires from one-third to one-half the exposure. Thus it will be seen that at least double the number of prints can be produced in a given time from any negative when carbon is employed than it is possible to obtain when silver is used. Added to this advantage it is possible to still further shorten the exposure by taking advantage of the so-called "continuating action" of light—a property possessed by exposed carbon tissue. It is to this property we are now about to direct attention.

In the early days of the carbon process it was frequently noticed that prints which had been kept for some time after printing and before development often turned out to be much darker than was anticipated; but not always. This at that time was attributed to one of the *uncertainties* of the process, and naturally caused much disappointment amongst experimentalists. Some five or six years back Captain Abney brought the subject before the Photographic Society of Great Britain, and showed that carbon prints which had only been partly printed would, if kept in the dark, gain in exposure, and that a print which had received but half the requisite time in the printing-frame would, if the development were deferred some twelve or fourteen hours, prove to be quite as good as if it had received the full exposure. This fact was denied by many, and if our memory serve us rightly even the Photographic Society of France disputed that any such property existed. At the June (1877) meeting of the Photographic Society of Great Britain Mr. J. R. Sawyer read an able paper on this subject, which he illustrated with some well-chosen examples that showed incontestably not only that this action did exist, but that it went on much more rapidly when the printed tissue was freely exposed to the air than when it was protected from its influence. He also showed that prints which had only received one-sixth the requisite exposure would yield quite as good results by keeping some days as if they had been fully exposed in the frame.

Our readers will, doubtless, remember that in an article which appeared in The British Journal of Photography (No. 897) for July 13th, 1877, we gave details of some experiments we made when on a visit to Mr. Viles, of Pendryl Hall. We, in conjunction with that gentleman, found, when using the solar camera for making enlargements, that by substituting carbon tissue for silver paper the requisite time of exposure was reduced from one hour to twenty minutes. That was when the picture was finished at once; but it was still further reduced to six minutes when the picture was kept for twenty-four hours before development. Thus we see that, by taking advantage of this property, ten times the number of prints can be made in carbon that can be produced in silver; and, by taking still further advantage of this continuing action, as Mr. Sawyer has done, a still larger number can be obtained.

We have now shown that the carbon process possesses many advantages over silver in the rate of production. Being anxious to know how far this continuating action was utilised in actual practice, we applied to several workers, and they all informed us that the action was too uncertain to be of any practical value, as they found that, occasionally, the requisite gain was sometimes obtained in twelve hours, which at other times required as much as twenty-four or even thirty-six hours to bring about the same results; hence they had not been able to take that advantage of it in practice which might have been expected. Now, from this it would appear that some factor was at work which had not been taken into consideration.

In a recent conversation with Mr. E. W. Foxlee, who is well known as an ardent experimentalist as well as a worker in the carbon process, that gentleman informed us he had found that the so-called "continuating action" was entirely due to moisture in the tissue, and that if it were made thoroughly dry after exposure, and kept so, no darkening of the picture occurred, the "continuating action" being totally arrested, so that a print might be kept a month or more after exposure and before development in so far as this action was concerned. He also informed us he had found that this action was most energetic when the exposed tissue was kept in a warm and damp atmosphere, and least so when in a cold and dry one. If this theory be correct—and our experiments, as far as they have been carried, fully endorse it—there can be no doubt this will very materially aid in the production of carbon prints by making this hitherto uncertain action better understood, and enabling printers to bring it more under control.

That our readers may better understand the matter we will here detail one of Mr. Foxlee's experiments. He took a piece of tissue and placed it on six test negatives which had been found by experiment to require exactly the same time to print. These were then exposed to light for only half the time that would be required if they had been finished at once. The insolated tissue was then divided into six pieces, each piece being a complete picture. One of these was developed at once, and it proved, as was expected, to be only half done. Two other pieces were put into an air-tight metal case, and the lid secured by means of gum paper, so as to prevent the access of air. The remaining three pieces were transferred to a drying closet, and allowed to remain until they were thoroughly desiccated, or as near so as the composition of the tissue would permit. They were then put into an air-tight case, and the lid securely luted on with india-rubber. Twenty-four hours after exposure the case containing the two prints that had not been dried was opened and one of the pictures removed, the case being again closed and secured as before. Upon development this print proved to be nearly dark enough, though not quite sufficiently so. Four days after the exposure the second print was removed, and upon development it proved to be very nearly insoluble; but, by dint of long soaking in hot water, a very much *over-printed* picture was obtained. On the seventh day the case containing the prints that had been dried was opened, and a print removed (the case being, of course, secured as at first). This proved, on development, to be quite as soluble as the first piece had been, and the picture not a bit darker. Twenty days after another piece was developed, and this, like the previous one was found to have gained nothing either in exposure or insolubility. Sixty days after the sixth and last print was developed, and it proved to be very nearly insoluble—quite as much so as the third picture, which had been kept four days only, but the gain in exposure did did not seem quite so great.

Mr. Foxlee attributes this gain and insolubility to the tissue having absorbed moisture from the atmosphere when the case was opened (this, he says, it will do with great avidity when it is in such a very dry condition), as the air was very damp at the time. This is borne out by the fact that it was not so crisp as when first sealed up. Mr. Foxlee has shown us a print that was kept for seven weeks after exposure which is not a bit darker than one from the same set of negatives developed immediately after exposure.

These experiments cannot fail to be of much interest to carbon printers, and will greatly tend to remove what has hitherto been considered one of the uncertainties of the carbon process. We hope Mr. Foxlee will continue his experiments, and that he will give our readers the benefit of such tentative experiences.

A REALLY RELIABLE DRY-PLATE PROCESS.

A communication to the Photographic Society of Great Britain.]

Although from time to time an immense number of formulæ for collodio-bromide processes have been published, I am induced to add still one more to the list, and, I believe, not without some satisfactory reasons. I have entitled this paper *A Really Reliable Dry-Plate Process*, as I feel convinced from a multitude of trials, under the most varied circumstances, that plates prepared in the manner I am about to describe fulfil all the requirements of the artistic photographer, whether amateur or professional; and, so far as I can judge, there is only one respect in which they might be improved. A little extra rapidity would add to their value; but even this I hope soon to gain. It must be borne in mind it is of the plates themselves, when ready for the camera, I speak as being all but perfect. In the method of their preparation very many improvements may in time be made.

It will doubtless be within the knowledge of many of my hearers that for many years past I have devoted a great deal of time and labour to experiments on various emulsion processes; that I have, from time to time, at longish intervals, published formulæ for the help of others working in the same direction as myself; and also that I have often shown at the Society's exhibitions pictures produced by the methods I at the time advocated.

We began with a very simple process, and then as we went on from step to step all varieties of complications were introduced with much pride by different individuals. Then came a reaction. We almost returned to our pristine simplicity; and at last the *washed* emulsion process was invented, and ultimately became a practical commercial success. When this stage was reached we most of us imagined the experimentalists might take a well-earned rest, as we had obtained what had so long been desired—a simple and sure process. But soon these delightful dreams were rudely disturbed, and we awoke to the knowledge of difficulties of a new kind, and after much disheartening work I began to think we had, after all, been working in a wrong direction, and I even hinted in print at my melancholy convictions. Spite of the exquisite simplicity of the method, and the very fair quality of the negative given by many of the washed emulsion processes, I was compelled to confess that I, at least, could not prepare plates by the process which, after keeping for some time, give even decent negatives, and hundreds have echoed the same doleful tale.

To those who have taken any interest in the subject, the discussion on the peculiar spots and markings which almost were the defect on these plates must be too familiar for any need of much reference to it now. Suffice it to say my own convictions, based on a multitude of experiments, were at the time quite in accordance with those of most other workers as to the cause of our trouble; and in a short article in both this year's almanacs I recorded my opinion that our enemy was simple organic dust, and at the same time held out hopes of a cure. Doubts have recently been thrown on the correctness of our supposition as to the cause of the spots, and I am anxiously awaiting Captain Abney's promised disclosures on the subject.

However, be the cause what it may, we are all agreed that the use of a "preservative" in the preparation of the plate will entirely prevent the appearance of the pests; and I am much pleased to be able to give formulæ by which films possessing the following most desirable qualities may be produced with certainty and rapidity. First: the *quality* of image is almost perfect, much resembling that given by a really good collodio-albumen plate. Secondly: the films will keep for a lengthy period without deterioration, both before and after exposure. I shall exhibit a negative which was kept five months before exposure, remaining for three months in a dark slide, and carried about on long journeys, being submitted to many variations of temperature and hygroscopic conditions of the atmosphere. After exposure and before development it was kept five weeks. Other plates have been kept three months after exposure. I give these *data* as many folks' ideas of a "lengthy period" are various. I have plates prepared early this year which I am keeping on to test from time to time.

In exposure very great latitude is allowable—an unspeakable boon to the photographer on a tour, with no conveniences for developing a trial plate from time to time. This last summer I took a number of plates away with me on a three months' outing, and exposed some of them from time to time on a variety of subjects, and many times felt quite at sea as to the proper exposure to give, and yet on my return home I developed every plate I had exposed into a decent negative.

Another point of importance is that the development is simple, entirely under control, and the most varied effects may be produced during its course by judicious use of the powers alkaline development give us. Some may think it rather late to bring forward a slow process in these days of extra rapidity; but I for one require plates to give me *pictures*, and I must have materials over which I can exert some influence during the progress of the chemical changes which produce the visible image. I must be able to modify the action of the developer, both generally and locally, and so be able, to a certain extent, to raise the production of a negative from the region of mechanics to that of art. This we cannot do at present with gelatino-bromide plates, and, until the extra-rapid films are as much under control as the slower collodio-bromide, I shall surely keep to the latter for general work, reserving the "rapids" for special and exceptional cases.

Before giving my formulæ and working directions I must (once for all) disclaim any claim at novelty. It has only been by making use of the experiences of many fellow-workers that I am able at last to give a formula with entire confidence, and you will find in it very little indeed that has not been published before, either by myself or others. It would unnecessarily take up your time were I to try and apportion the credit of each point to its proper author; and, besides, it is not needed, as most of you are acquainted with the whole history of emulsion work.

I have lately been asked if a commercial washed emulsion would not answer for the process as well as the one I recommend. Unfortunately I have not succeeded nearly so well with any of the host I have tried as with the one I am now about to describe. However, I have reason to hope the drawback of each one having to prepare his own emulsion will speedily be removed, one house having already requested permission to prepare it strictly according to my instructions, and to vend it under a distinct name.

And now to give the formulæ as briefly as possible:—Prepare first a stock of plain collodion by dissolving 160 grains of ordinary pyroxyline in six ounces of absolute alcohol and ten ounces of ether. Good methylated alcohol will answer for these first solvents, as also ether s.g. 730, purchasable at 1s. 6d. per pound. Also make an alcoholic solution of zinc bromide, eighty grains to the ounce. Even after filtering this solution will throw down a deposit upon keeping, and this must be carefully left undisturbed.

To make ten ounces of washed emulsion, take five ounces of the above collodion and add to it one ounce of the zinc bromide solution and twenty minims of syrupy lactate of ammonia.*

Sensitise with 150 grains of silver nitrate, dissolved first in eighty minims of water and then in three ounces of strong alcohol. Boil together, and add it to the bromised collodion at once. I attach importance to the addition of the boiling solution, so as to raise the

* Some experiments made since this paper was first written go to show that a great gain in sensitiveness may be obtained by reducing the proportion of plain collodion. I have tried three ounces, and even two ounces, instead of the five, with the most encouraging results. I am indebted to leaders in The British Journal of Photography for the suggestion.

temperature of the mixture, and when only a small quantity (such as the above) is made I take the precaution to wrap the bottle in a thick cloth to retain the heat as long as possible. On examining the portions just given it will be seen the silver nitrate is decidedly in excess, and that the alcohol is used in larger proportion than usual.

Lactate of silver has long been a favourite addition of mine to emulsions, and I am more than ever pleased with its action. I must call attention to a curious effect which is produced if the bromised collodion be allowed to stand many minutes after the lactate is added, and before the sensitising. The collodion becomes quite milky, and throws down a crystalline deposit. It is well to add the lactate immediately before the silver, or even to defer putting it in until after the sensitising. I cannot pretend to say what chemical or physical effect occurs in the "lactised" collodion. I merely mention the fact.

The emulsion is ripe in about twenty-four hours; but I am disposed to think it an improvement to keep it for a longer time—up to three days. At the expiration of the ripening period twenty minims of strongest nitric acid are to be added, and the emulsion well shaken. I prefer to add the acid just before the washing instead of at first. I believe a better film is given by so doing.

We are now faced with the question of how best to wash the emulsion. Shall we pour it out and evaporate the solvents, or precipitate it? From a lengthened experience of both methods I cannot recommend precipitation, except in cases where the finished emulsion is to be used up within a month. It is now a generally-acknowledged fact that precipitated emulsions will not keep. But where large batches of plates can be prepared at a time, and no waste occurs, I can speak to the good qualities of the emulsion when precipitated by mixing it with twice its bulk of the following organifier, and when the pellicle has fully separated and set, washing for some time in water containing a little nitric acid (half-an-ounce to one gallon), and finally in several changes of pure water:—The mixture:—Tannin, 500 grains; gallic acid and grape sugar, each 200 grains; strong acetic acid, ten ounces, or a proportionately lesser quantity of glacial is to be dissolved in water and made up to 100 ounces. This method is expeditious. The alternative and, I think, the better plan, is to pour out the emulsion into a sufficiently large dish (one ounce to twenty-five square inches, or say five ounces in a 12×10 dish). Evaporate the solvents more thoroughly than usual; in fact, the pellicle may be allowed to get almost dry, wash first in water containing half-an-ounce of nitric acid in one gallon of water, and then in plain clean water for some considerable time. If the water in use is hard, distilled water should be used at first. And lastly, wash thoroughly. The extra drying of the pellicle, and the large proportion of alcohol it contained, will materially assist in shortening the time. When dry, dissolve the above quantity of pellicle in five ounces of pure absolute alcohol, and a like quantity of extra-purified methylated ether, s.g. 720. An emulsion prepared in this manner with the lactate of ammonia will give excellent negatives without further preparation if the plates are used at once; but its subsequent treatment with alkaline albumen gives the especial qualities for which I so greatly value it. The plates are much quickened by the after treatment. This particular emulsion has its sensitiveness doubled, whilst some others are rendered slower.

A substratum is necessary for all plates above half-plate size, and I know of nothing for the purpose to equal the insoluble gelatine I introduced some little time ago. For convenience sake I repeat here the method of preparing and using it:—Soak sixty grains of Nelson's best sheet gelatine in water, drain, and pour on ten ounces of boiling water. Then add two drachms of a ten-grain solution of chrome alum. Stir vigorously. Filter and use whilst warm. Coat the plates without drying them after cleaning, and after draining place them to dry in a box or cupboard with the lower edge resting on clean filtering paper. They must be completely desiccated before use. A good plan is to heat them singly and to coat as soon as cold. Small plates may have an edging only either of the gelatine or india-rubber; but I prefer to give them the full coating. It is less trouble by far than wiping and polishing the plates. Coat with the emulsion. When well set immerse in water. I use a grooved box, well coated with shellac, and when I have coated and immersed as many plates as I intend to prepare I cover up the box and thoroughly ventilate the room, so as to get rid of all fumes of alcohol and ether before proceeding further. I see no reason why a tin box with removable grooved pieces, similar to the ones sent out by the Autotype Company for developing chromotypes, should not answer. Of course it must be kept for this purpose alone.

The plates are now to be flooded with the alkaline albumen or dipped in a bath of it. In either case the albumen must be in contact with the film for at least a minute. The plate is then to be thoroughly washed, flowed with a preservative, drained, and dried. After backing it is ready for the camera. The albumen may be prepared in bulk either with white of eggs or with the pure dried preparation. Of the latter dissolve sixty grains in three ounces of water and add one drachm of strongest liquor ammonia, 880. If white of egg be used, first pour in a few minims of dilute acetic acid and stir well. In two or three hours strain, and to each ounce add two of water and one drachm of liquor ammonia.

For the "preservative" I have tried a host of substances, and find the simplest of all to be the best, viz., a two-grain solution of gallic acid. For the sake of constant uniformity and certainty I was anxious to discard from my formulæ all compounds of uncertain chemical constitution, such as beer, or even tea and coffee; or else I could, from my own experience, speak strongly in favour of a decoction of tea, made by boiling one ounce of compressed fine black tea in four ounces of alcohol and twelve ounces of water. One ounce of this is diluted with ten ounces of water to form the final coating for the plate. It is of importance that the plates should be thoroughly dried, especially if intended for packing; as, although these plates will stand exposure to a moist atmosphere better than most others, any damp remaining in the films when they are stored away will be a source of future trouble.

I trust I shall not be thought tedious if I devote a very short time to a description of my method of packing dry plates. It is old enough, as Mr. R. M. Gordon and I have used it for years, and I believe both of us have described it more than once. Cut some strips of cardboard a little more than a quarter of an inch wide, and glue them down on a piece of silk, strong muslin, or other flexible material, about one-eighth of an inch apart. When dry, cut with a sharp knife along the centre of each strip of cardboard, thus making a number of strips of flexible material with a strip of card one-eighth of an inch wide glued on each edge. For large plates the card may be wider. The space between the strips should be equal to the thickness of two plates. Cut the strips to the length of one side of the plates. To pack a dozen plates, lay one on the table face upwards, and, taking two others in the hand, place them back to back (without anything between), and put one of the card and linen guards over each end; lay these on the single one, and then on them place two others back to back as before, without any guards, then two others with guards, and so on until enough are thus laid in a heap, when we finish with a single plate, face downwards. It will be seen from this that two guards will suffice for four plates, and although the faces are kept away from one another by the strips of card the backs of the plates have nothing between them. To protect the parcel of plates I wrap it first in very thin sheet gutta-percha, then in tinfoil, and finally in good brown paper. Although perhaps too expensive a method for commercial use, I consider it perfect for amateurs, who can use their cardboard, guards, gutta-percha, &c., over and over again.

Returning to the plates themselves: the next point is the exposure. As I have before said, they are not very rapid, and it is well to give a full time in the camera.

In referring briefly to the development, I may sum up my experiences in the form of a few maxims to be observed:—Beware of strong pyro. Use it very light to begin with—from one-fourth to one grain per ounce—and add carbonate of ammonia and bromide of ammonium as the exigencies of the case may require. For a $7\frac{1}{4} \times 5\frac{1}{2}$ plate I usually begin with an ounce of water with half-a-grain of pyrogallic acid, one drop of a saturated solution of ammonia carbonate, and a like quantity of a ten-grain solution of ammonium bromide. Use patience and do not hurry the development. When all the details are out a little stronger pyro. will give plenty of intensity. Beware of making the image too intense; this is easily done. By pouring the developer repeatedly from the measure upon one spot, especially if a little extra ammonia be used, local detail may be coaxed out, and by employing the same plan with stronger pyro. local intensity is easily obtained. With these plates the developer may be used almost like a painter's brush, and it is only by the intelligent and artistic use of all such means to an end that *pictures*, such as a true artist would value, can be produced by means of the camera.

In conclusion: I must again for a moment refer to the want of novelty in the foregoing. In some quarters I know a certain amount of curiosity has been excited by my new process; and, although I have many times declared I was only working upon old ideas with a slight leavening of new ones, I fear a good many may be disappointed at first when they find there is really so little new after all.

All I can say is I am thoroughly well satisfied with it, and feel amply rewarded for the years of labour I have devoted to emulsion work. I can only trust, if others will strictly follow out the formulæ and directions given, they will be equally pleased with the certainty and simplicity of the process and the excellent quality of its results; and I hope they will then feel as grateful as I do myself to the many experimentalists through whose united labours we are at last in possession of so good a process. H. COOPER, Jun.

A CASE OF THE DESTRUCTION OF THE LATENT IMAGE ON WASHED EMULSION, AND ITS RESTORATION.

[A communication to the Photographic Society of Great Britain.]

WE do not nowadays hear much talk of proselytism, but I must confess I take great pleasure in converting a photographer from the wet process to the dry.

Some time since my friend, Mr. Payne Jennings, and myself discussed the question of wet *versus* dry processes, and I succeeded in getting him to solve it by actual experiment; and, being a great admirer of the high artistic skill of the solver, I endeavoured to do all in my power to make my favourite emulsion process a success in his hands.

Our scene of operations was Bolton Abbey, in Yorkshire, and, to be quite certain of giving proper exposure, I took down a tent and the necessary chemicals in order to develope a plate occasionally. Two days before we started I got my friend's camera, and washed and varnished it, and this, as I expected, proved a perfect protection against spots, which invariably occur when a camera which has been long in use is employed for emulsion work. I took 12 × 10 plates prepared with washed emulsion, and without any substratum or preservatives, the surface of the glass before washing being rubbed with talc or French chalk to prevent the slipping of the film during development. We also had 12 × 10 plates to clean on the spot, and a good quantity of emulsion in bottles, together with sensitive tissue in blocks, and my own apparatus and roller slide. When we arrived at St. Pancras station, and all our luggage was put together on the platform, I confess I felt uneasy, as the amount was not likely to impress my wished-for convert with the reputed portability of the dry process over the wet. After a day's travel we arrived at Bolton Abbey in the evening; but, owing to a want of accommodation in the hotel, we were forced to convert a shed used for picnic parties into a regular laboratory. The next day we began our operations early, exposed a plate, and having erected our tent, developed it, and it proved perfect. So satisfied were we with our success that we proceeded to photograph the abbey and magnificent scenery with which we were surrounded, leaving development for a later period. In the afternoon of this first day we experienced windy weather, and from this time till our departure the weather broke up; but having made such tremendous preparations we decided to remain in Bolton to wait for fine weather, but everything was against us. One of the heaviest thunderstorms of the season caught us when we were away in the woods some half-mile from the hut where we had left our reserve plate boxes in the open. When we arrived, after the storm had somewhat abated, we found everything drenched, and literally drowned in water. The water in the hut covered the tops of some of the bottles, and mixed with the various chemicals used for development, giving them a dark brown tint, and floating in it was a portfolio containing exposed sensitive tissue—our hope and my pride.

During the morning we tried to develope a plate or two, and they came out well, as did some of the drowned sheets of tissue. On our return to London, owing to press of business matters, we did not develope the remainder of the plates till a week had elapsed, and, alas! the first, second, and third plates proved complete failures—an unmistakable indication of the destruction of the latent image. After the ordinary treatment the sky line appeared, then fog, and no variation in the mode of development could save the plate. This was incomprehensible. I have seen a similar occurrence when the plate was kept a long time between development and exposure; but then a fortnight is not a long interval.

Casting about for a reason of this destruction, I could only account for it from the influences of ozone generated during the thunderstorm in Bolton—an opinion conformable to that held by Captain Abney. Whatever the cause, I was greatly annoyed at the failure; but considering that an antidote must exist I looked about for one. I experimented on the tissue in my roller slide, and also in Mr. Skeen's, who accompanied me, and I was rewarded by complete success.

Cases of the sudden and inexplicable disappearance of the latent image on dry plates are recorded by many experimentalists, and hoping that the remedy I shall now describe may be useful in like instances, I have thus minutely entered into details.

After the plate is treated with alcohol and washed with water it is *immersed* in a saturated solution of carbonate of ammonia, where it remains some four or five minutes. It is then drained and developed in the ordinary manner. I do not wish to enter into an explanation of the action of the carbonate of ammonia, because I cannot avoid being empyrical; but I cannot help putting on record that it dissolves away a certain amount of the silver compound (presumably oxide of silver) from the *exposed* plate, which can be detected by the adding of potassium bromide to it. There is every appearance that this salt, formed by atmospheric influence, is the cause of the evil, and that it is soluble in the carbonate of ammonia. When it is removed the plate is just as amenable to development as when in its best condition.

I conclude these observations by stating that all Mr. Payne Jennings' negatives on glass or tissue were successfully developed by this treatment. Some of them are exhibited in this room. I may also mention that some very old tissues, exposed two years ago and not developed, gave me good results when so treated. In my experiments I treated only half the plates with the carbonate. I developed the two portions simultaneously. The difference in result is striking. LEON WARNERKE.

PRACTICAL INSTRUCTIONS IN MODERN PHOTO-MECHANICAL PRINTING METHODS.

PART I.—PHOTOLITHOGRAPHY.

VIII.—FAILURES AND THEIR REMEDIES.—A very frequent source of failure arises from a tendency towards a general insolubility on the part of the bichromated organic matter which forms the sensitive surface of the transfer paper, the result of this being a general adhesion of the printing ink to every part of the surface, notwithstanding a prolonged soaking in water. Now, taking bichromated gelatine as a type of the sensitive surfaces one has to deal with, it must be remembered that insolubility is not only induced by the action of light, but also by other agencies. In actual practice complete insolubility is seldom induced by accidental or unforeseen causes, but it often happens that a sufficient tendency to a general insolubility occurs to seriously interfere with the operations of the photolithographer or to cause entire failure.

The most frequently-occurring causes of insolubility on the part of the sensitive coating of the transfer paper are the following:—Slow drying. Presence of reducing agents in the air, among which may be mentioned sulphuretted hydrogen, effluvia from drains, and sulphurous acid arising from the combustion of coal gas. The continual addition of moisture to the air, which may happen when a paraffine stove is employed for producing the heat and provision is not made for carrying off the water formed by the combustion. Long keeping of the sensitive transfer paper, especially in a damp place.

The injurious tendency of all the above circumstances is considerably lessened by keeping the air slightly charged with ammonia, this being most conveniently done by saturating a tuft of cotton-wool with strong ammonia solution and placing it in the drying-room. In the case of dry paper a few lumps of ammonia carbonate may be placed in the box where it is kept.

Some other causes of insolubility are enumerated below, and in each case the remedy is obvious:—Omission to add ammonia to the bichromate bath. Use of paper containing alum. Inadvertent exposure to light. Over-exposure under a thin negative. Use of a gelatine hardened by the addition of alum.

It sometimes happens that the gelatinous coating of the transfer paper dissolves entirely away during the operation of developing the transfer, and the surface becomes, in consequence, entirely denuded of ink. This generally happens when an exceedingly soluble gelatine has been employed for making the transfer paper, or when the gelatine has been deteriorated by its solution having been kept hot for several hours. This dissolving away of the coating from the paper is more likely to happen when the coating is unduly thick than when the thickness is moderate. Remedies: use of a harder sample of gelatine or increased exposure.

Ink is often removed in patches from the lines of the transfer by the use of a brush which has become matted or clogged up with ink. In developing the soaked transfer with a wet camel's-hair brush no adhesion should be noticeable between them, or the transfer is likely to be damaged.

After insolubility, the most frequent cause of failure in the process of making a half-tone or stipple transfer, as described in the preceding chapter, is damage caused by a slight rubbing action during the use of the inking brush, the consequence of this being the removal of portions of the farinaceous coating, together with some fibres of the paper.

The failures incident to the transference of the fatty image to the lithographic stone arise from a variety of causes, and the principal iculties arising at this stage of the process are as follow:—Puckering up to the transfer when the pressure is applied. Non-penetration of the ink into the stone. 3. Undue adhesion the transfer paper to the stone. 4. Blurring or spreading out of lines. 5. Slipping of the transfer on the stone. 6. The image, a great part of it, remaining on the transfer paper.

The puckering up of a transfer when the pressure is applied may se from the fact of the transfer being too wet, and the mischief y be exaggerated by the tympan being insufficiently stretched or perfectly lubricated. Too much backing material often increases tendency to puckering. In addition to altering the above-ntioned unfavourable conditions, the sheets of French-chalked per, recommended on page 556 of the present volume, may be erposed between the transfer and the tympan. This remedy is nerally useful in any case of the transfer slipping over the stone. non-penetration of the printing ink into the stone generally arises m extreme hardness on the part of the stone or from the presence moisture or mucilaginous matter in its pores. An ink highly rged with pigment has less tendency to penetrate than an ink taining a small proportion; it is, therefore, sometimes advisable add lithographic varnish to the ink employed for coating the nsfer.

One of the most annoying sources of failure is an extreme degree adhesion between the transfer paper and the lithographic stone, d this generally arises from the fact of the stone being made so as to partially melt the gelatinous coating of the transfer paper. a case of this kind rather warm water will have to be employed order to effect the removal of the paper; but it is extremely diffi-t to remove all traces of gelatine, so as to enable the gum to netrate into the pores of the stone. When circumstances render desirable to use transfer paper rather thickly coated with gelatine, d to warm the stone rather more than usual, it is as well to harden transfer by immersion in a ten-per-cent. solution of chrome alum ore putting it down on the stone. Blurring of the transferred age generally occurs if too much ink has been applied to the nsfer in the first instance. When a transfer is observed to be er-inked it is generally advisable to put it down on a stone only a degrees warmer than the air of the room. The fact of the fatty age on a transfer remaining entirely or partly adherent to the per, instead of becoming transferred to the stone, generally arises m insufficient damping of the transfer, from the partial or complete ying of the fatty ink, or from insufficient pressure.

The greater number of the difficulties which are likely to trouble beginner will probably be found to occur during the operation of nting. Let us first devote attention to cases in which the whites the subject become inked, and under this head may be included only a general tinting of the whites but also the presence of dark ots, and a gradual clogging up of the fine portions of the subject.

Some lithographic stones are so porous that the moisture applied the surface is immediately absorbed, leaving the face of the stone dry as to become tinted by the ink. In a case of this kind it is ll to put the stone into a tub of water until it is moistened all ough.

During the operation of printing it frequently happens that old ages, which have been imperfectly removed by grinding, make ir appearance. As soon as a spectral image of this kind is iced a transfer must be printed from the defective stone, and it ould then be put down on a fresh stone. Any trace of the old age which may be transferred with the device may generally be aned off by rubbing with a small slip of snake stone, followed by energetic an acidulation as the subject will bear. Old oil or grease rks on a stone naturally lead to similar difficulties, and require nilar treatment.

Sometimes traces of greasy matter in the gelatine employed for ating the transfer paper give rise to markings on the stone, and if ese markings are not very intense the mischief can often be reme-ed by a strong acidulation, or by erasure with snake stone. When e stone has been made so hot as to melt the gelatine of the trans- paper it often happens that some of this substance penetrates so eply as to prevent the proper action of the gum and the etching id. In a case of this kind a tinting of the whites often occurs er a number of copies have been printed off. Occasional re-idulations will generally prove a remedy, as the gelatine gradually comes eliminated, making way for the action of the acid.

The use of very hard water for the moistening of the stone will casionally cause a slight tinting of the whites, but a re-acidulation ll generally prove a remedy in a case of this kind. A gradual ogging-up of the finer parts of the subject often arises from under-idulation in the first instance. As soon as any indication of this is served it is well to re-acidulate with as strong an etching fluid as can be ventured on, and, at the same time, to see that the ink is not too thin or the roller too highly charged. A little of the etching fluid may also be added to the moistening water. A rise in the temperature of the rooms where the operation of printing is conducted will sometimes soften the ink and cause a tendency towards clogging-up, it being merely necessary, in a case of this kind, to employ a stiffer ink.

Other causes which tend towards a tinting of the whites and a gradual destruction of the device by the undue deposition of ink are as follow:—A very soft roller; over-slow motion and undue pressure in inking; ink which is naturally too thin, or is made so by the presence of oil of turpentine remaining in the roller; the use of paper containing alum; the presence of soap in the cloths employed; or the use of a roller insufficiently prepared. Such a roller requires to be over-charged with ink in order to keep out the moisture, and this over-charging with ink is often quite inadmissible.

When the subject on a stone has become much damaged (run smutty) by the use of too thin ink, or insufficient etching in the first instance, it often happens that re-acidulation will not mend matters. In a case of this kind it is advisable to wash the stone with turpentine in the following manner:—After having well wetted the face of the stone with water, a few drops of oil of turpentine are poured on and rubbed over the device by means of a wet rag. The excess of ink being thus removed the stone is wiped, gummed, inked, and re-acidulated, after which it will generally be found to work satisfactorily. In conducting the above-described operation it is often advisable to employ a mixture of oil of turpentine and printing-ink rather than pure oil of turpentine.

Any well-defined and intense black spots which may make their appearance during the operation of printing are best removed by erasure with a sharp penknife, after which those parts of the stone which have been laid bare should be gummed and acidulated in the usual way.

Having now considered cases in which the whites of the subject become blackened during the operation of printing, we may pass on to a study of those cases in which the black parts of the device become gradually removed or destroyed. Among the causes of this kind of failure may be mentioned over-acidulation, the continual use of moistening water containing acid, an over-hard roller, or the use of an extremely stiff ink. The operation of washing out the image with turpentine will often much deteriorate it, unless care be taken not to employ much turpentine or undue friction.

The remedies for a gradual weakening of the device will naturally be as follow:—The use of a soft roller well charged with ink, accompanied by a slow motion and considerable pressure in its application. The rubbing-in of linseed or palm oil through a layer of mucilage spread on the stone will often prove useful, and in extreme cases friction may be continued until the stone becomes dry, after which it is washed with water, and the printing is resumed.

When the device on the stone is well defined and sufficiently inked, but the impression on the paper is grey or lacking in vigour, a deficient pressure may be suspected; and if the lines on the paper are ragged and a little smeared, while those on the stone are clear and sharp, it is probable that the ink is too thin or the paper is not sufficiently moistened.

The next branch of the subject to be considered will be the production of typographic blocks by photographic means.

T. Bolas, F.C.S.

NOTES ON THE PLATINOTYPE PROCESS.

[A communication to the Photographic Society of Great Britain.]

The process I have the honour of illustrating to you tonight depends upon principles which may not be known to all here. I will, therefore, with your permission, commence by giving a short sketch of them.

Ever since the dawn of photography it has been well known that ferric oxalate is very sensitive to light, and that thereby it is reduced or converted into ferrous oxalate. This piece of paper I have here has been coated with ferric oxalate, and has since been exposed to light under a negative. The image formed by light, which, though rather faint, you can distinctly see, consists of ferrous oxalate. But I discovered some four or five years ago that ferrous oxalate, when dissolved in a hot solution of potassic oxalate, instantly reduces the metal from chlorides and other salts of platinum.

This flask contains some ferrous oxalate. On pouring into it a solution of potassic oxalate and heating the mixture, you see that the ferrous oxalate has mostly dissolved, forming a reddish solution. Now, on dropping some of this platinum salt (K_2 Pt. $Cl._4$) into the flask, you perceive that the latter salt has been decomposed; the black powder which is now subsiding is metallic platinum.

Now, suppose a platinum salt is mixed with the ferric oxalate with which we coat the paper, we shall find upon exposing such paper to light that the ferric salt only is affected, being changed into ferrous salt, as in the first experiment; but the particles of this ferrous salt are now in contact with platinum salt. If, now, this insolated paper be floated on a hot solution of potassic oxalate, its ferrous image will be dissolved by the potassic oxalate; but we shall expect that at the moment of solution it will reduce, *in situ*, some or all of the platinum salt so intimately mixed with it. This is what really occurs, and the result is a picture in pure metallic platinum.

Until very recently I had discovered no means of getting down the platinum in a sufficiently fine state of division without the aid of a preliminary coating of silver salt. Now, however, I have overcome this difficulty. By adding a platinum salt to the developer I find that the metal is reduced in a very fine state of division.

Having given an outline of the principles upon which the process is based, I will now proceed to show how it is at present conducted.

The following materials are used:—Plain paper, or paper having a slight additional sizing of some colloid. A solution of ferric oxalate, containing about 130 grains of the salt to each ounce of water. A solution containing thirty grains of potassic chloro-platinite and five grains of plumbic chloride to each ounce of water. A solution containing in each fluid ounce 120 grains of potassic oxalate and seven grains of potassic chloro-platinite. A sheet of the paper is now suitably fastened on a plane surface. Equal quantities of the ferric oxalate solution and of the potassic chloro-platinite solution are mixed, and two fluid drachms of the mixture are evenly spread over the paper by means of a piece of flannel wound around a glass rod. The paper is now hung up to dry; as soon as all surface moisture has disappeared the drying is finished before a fire or stove. The paper is now ready for exposure under a negative. I may here remark that this sensitised paper has kept perfectly good in a dry atmosphere, both before and after exposure, for more than a month.

The time of exposure may be determined by an actinometer or by simple inspection—preferably by the former method. The length of exposure is about one-third of that required in ordinary silver printing. I have not shown these operations of sensitising and exposing, because they are so exceedingly simple and you are probably familiar with similar ones.

Now here are some papers which have been sensitised and exposed in the manner just described. The visible image is formed in ferrous oxalate; light has produced no effect on the platinum salt lying in contact with it. I will now float this print for a few seconds on this hot solution, which contains potassic oxalate and potassic chloro-platinite. On raising it you will see that the brownish ferrous image has been converted into a black one, an image or picture in metallic platinum. The potassic oxalate dissolved the ferrous image, and the solution thus formed, before or at the moment of leaving the surface of the paper, reduced the platinum salt in the manner I have previously described. The image, as I have just said, is now in metallic platinum—one of the most stable substances known to chemists, perfectly unalterable by any atmospheric influences, not oxidised in the air at any temperature, and not attacked by any single acid or alkali. W. Willis, Jun.

ON THE SUBJECTIVE AND OBJECTIVE OF PICTORIAL PHOTOGRAPHY.

[A communication to the Photographic Society of Great Britain.]

The title of this paper may possibly seem to be too metaphysical, and, therefore, not practical; yet, at the same time, the meaning of the terms used so well express what is desired to be understood that we shall accept them as the further carrying out of another term more frequently used when speaking about photography, viz., art-science.

Now the terms "subjective" and "objective" may be accepted as representing certain conditions which, at first sight, might appear to be almost similar, but which, when closely analysed, are found to be very different. Primarily, the term "subjective" refers to something arising from within the individual self; and the term "objective" to something outside oneself. Thus, anything that bears the impress of my mind upon matter, and which I, myself, create, is subjective; that which already exists, and which others create, is to me objective.

Now, probably, there is scarcely any other subject in which these terms can be so justifiably used as in photography, and just in proportion as one side or the other be cultured and made the serious study of its votaries so will the results tend towards the progress of its dual nature—art and science; but, unfortunately for the subjective, with which is connected the art side of photography, it must be closely united to the objective, with which is associated the science side of photography. And as the one depends upon emotion and feeling for success, it becomes difficult to reconcile or mix this up with the other side, which, being composed of facts, has nothing at all to do with emotion or feeling.

Hence, as it is far easier to imitate a physical model than to follow a mental example, so we find that the objective, or so much of the science of photography as is necessary for its manipulatory practice, can be and has been imitated to a great amount of nearly equal success, and the outcome exists in the general capacity to produce good negatives, so that on this side great progress has been made. On the other hand, the power of using the subjective side of photography, so as to impress an art value upon the work done, has been less cultivated, and therefore much less progress made.

In considering this matter I purpose only to take the subjective side of photography, and, as a matter of fact, it must be self-evident that all that emanates from oneself must be *subjective*; hence it follows that not a single pictorial photograph exists which does not bear an impress of its producer's individuality, whether it be good or whether it be bad.

Now the important question arises—Can photography be made the medium for the visible existence of art conceptions? The reply must be—Most certainly. But as I have hitherto always most carefully endeavoured to formulate in estimating its value, it should never be subjected to the same method, either of appreciation or criticism; that appertains to the products of a fine art. And, in passing, it may be observed that it is owing to the forgetfulness of this guiding principle that so many artists as well as critics of the public press, when speaking of photographic art, seem to entirely put out of thought peculiarities which accompany the production of pictures by the agency of science; and so, whilst it is very easy to condemn work as not approaching to some standards in fine art, it is seldom pointed out what is really praiseworthy and capable of further culture and advancement in an art direction. Why, then, is it that more artistic culture has not been brought to bear upon pictorial photography? One great reason is this: in its manipulative operations so much exists that is purely objective—viz., outside and beyond artistic impress—that hitherto the educated artist has disdained to use it for any other purpose than as a fixed substitute for original positions and detail.

And very naturally this to some extent must always be the case with those who have given time to train the hand not only to imitate what the eyes sees, but also, whilst doing this, to impress upon the work an individuality unmistakably different from the hand work of another artist. Hence what is wanted amongst photographers is not the academical student, but more of the cultivated connoisseur—one who to succeed must use his thinking faculties in training latent art feeling, in cultivating a taste for what is beautiful, and in studying how the masters in art, in producing their pictures, worked upon matter by impressing upon it their own emotions and feelings; and those only who can be touched by such pictures will succeed in finding out the motive power which was the germ of the successful work.

And in considering this matter we must never forget that the subjective in photography is made evident by a totally different mode of working to that necessary in fine art. The photographer can so little impress his work through the agency of the hands that the popular notion has arisen, and consequently the assertion been made, that photography possesses no subjective power, when possibly fifty pictures by fifty different people all show an equality in objective work, but where the subjective has been completely down at zero.

It, therefore, follows that any training of the hands to obey the impulse of artistic culture is unnecessary in photographic study; but at the same time it lays a most difficult task upon the mind, which has to design, carry out, and perceive the entire picture in all its detail—modelled in absolute reality before any pictorial *facsimile* can be produced. It is this fact which makes the thought of producing pictures so almost impossible to those who possessing latent art tendencies try to give an existence to the same through the agency of photography.

Having so far endeavoured to explain what I have in view, it may be asked—Why use complicated terms to express a simple idea? The reply must be that, as the subjective side of photography is almost totally a purely mental operation, it follows that the mind alone needs training; and as one means to that end I cannot but think the constantly having before us some word or phrase which shall serve as the watchword that immediately brings to mind a distinct and leading principle will cause some amount of *thinking* to understand, and thus the commencement is made in the direction of the study required.

At some future opportunity I shall go further into the subject, closing this paper with the words of an eminent living American theologian, recently spoken:—"An artist is a man who has the power of changing an idea into a thing; no man is fit to paint a picture who merely copies. The man that simply makes a portrait of a man is an artisan—he is respectable, but he is only an artisan; whilst the man who has a mind so rich that he sees something that the man suggests as well as that which the literal photographer depicts—the man who moves in a larger atmosphere, and beholds the more suitable relationship of things, and has power so to reproduce them in matter that others can see or feel them, even if they cannot analyse them—that man is an artist." Edwin Cocking.

Our Editorial Table.

York's Lantern Catalogue for 1878-9, and Lantern Readings.
London: Frederick York.

The new catalogue of slides and other appliances for the magic lantern just issued by Mr. York is exceedingly comprehensive. We very well remember the first catalogue issued by this enterprising *entrepreneur*, and it is interesting to compare the goodly *brochure* now before us with its small but stimulating predecessor. When we say that the new catalogue is both comprehensive and suggestive we have said all that is needed. We could not hazard a guess at the number of thousands of subjects for the magic lantern here catalogued; but they are all well classified so as to make reference very easy. Of the merits of the pictures themselves we have only to say that the great skill of Mr. York, who is a practical photographer of the highest eminence, has been thoroughly utilised in the production of slides on a scale of great magnitude. We have carefully examined a series of views taken in Paris by Mr. York himself, which, as regards both artistic and technical merits, cannot be surpassed. What we specially prize in Mr. York's transparencies is their permanence—a point on which we can speak with all confidence. Indeed the sterling qualities in these slides have been recognised by every connoisseur.

The lantern readings form useful hand-books to accompany the respective sets of slides. As a rule they are ably written, and afford the greatest possible amount of information in the most condensed form. Among the subjects of those more recently issued are *The Russo-Turkish War*, *The Human Body*, *Paris and the Recent Exhibition*, *Electricity*, *Central Africa*, and others.

Mr. Talbot Lane's "Economic" Chromotype and Combination Printing-Frame.
London: Maull and Fox.

The opportunity for carefully examining this frame—which, owing to pressure of business, was impossible at the Technical Meeting of the South London Photographic Society—has since been afforded to us, and we are now in a position to speak of it in detail. This, however, we prefer not to do at present, but wait until the specification of the patent is open to our inspection. It is sufficient here to say that the frame, which is very ingeniously constructed, permits of a variety of "effects" being obtained in printing, either in silver or carbon. But from the subjoined remarks, which were submitted at the Technical Exhibition, our readers will, meanwhile, be enabled to form a fair estimate of this printing-frame:—

"It will be seen, from an examination of the "economic" frame, that chromotype and combination printers have a still further choice of means at their command for the production of their specialities, and one that will be found to combine within itself special features which are likely to be fully appreciated by those who use it.

"In the first place, it may be noticed that there is not the trouble of having to use *two* frames for the production of one picture; and, in the next, that every frame carries its own actinometer, thus rendering it perfectly independent and complete in itself. The actinometer is so placed in each frame that the eye may pass along a row and detect the condition of each at a glance.

"There is also a clever arrangement for vignetting, which will enable photographers not only to vignette with ease and certainty, but also to print a tint on the paper, thus doing away with the strong contrast which is often so painful to see.

"Masks and discs are provided with each frame, and they are so made that they can be used alternately, being secured in position by means of a spring. The masks and discs are united to each other at the end or side as the case may require, forming, as it were, a couple of leaves. The discs are mounted upon a transparent medium which receives letterpress, thus printing an address, &c., whilst the tint is being printed.

"The frame and its appliances are used in the following manner:—After placing a negative in it adjust one of the masks over the negative, and secure the end of the mask by the spring. Turn the disc backwards, laying it down out of the way, then place the prepared tissue or sensitive paper, registering it by the corner of the frame most convenient (the frame has a raised ledge for this purpose), and print, adjusting the actinometer as desired (it is an advantage to mark tissue on the back, so as to be able to recognise the registered end). When printed take out the negative, do not alter the spring holding the mask in position, replace the negative with a plate of clear glass, turn the mask underneath and backward, bring the disc over and forward, replace the tissue or silvered paper, and complete the printing.

"It will be seen that this mode of working places in the hands of a printer the means of securing by masks and discs of various shapes numerous combination effects, as backgrounds, clouds, &c., may be added or suppressed at will.

"In using this frame for chromotype work a considerable saving of time can be effected by cutting the tissue twice as long and twice as broad as the negative to be printed and folding it once, or, if there be two negatives on a plate, eight copies can be printed on a single sheet, and, of course, all developed or transferred by a single operation.

"The frame shown will print one $8\frac{1}{2} \times 6\frac{1}{2}$ or two cabinets, or four *cartes de visite* in silver and one $8\frac{1}{2} \times 6\frac{1}{2}$ autotype print, or one cabinet or two *cartes de visite* in chromotype work, the chromotype and combination printing being for the smaller sizes. A frame is being prepared by which larger sizes in combination printing will be executed. Of course the vignetter is available for either carbon or silver printing."

Full details as to its construction will be given on an early occasion after the specification is open to inspection.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 26 ..	Oldham	Hare and Hounds, Yorkshire-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

As we stated in last week's number that the discussion on the papers read at the meeting held on Tuesday, the 10th inst., would not be sufficiently clear in the absence of the papers, we now give both the papers and the discussion thereon, for which we are indebted to the official organ of the Society.

On the conclusion of Mr. Henry Cooper's paper on *A Really Reliable Dry-Plate Process* [see page 602], and Mr. L. Wanerke's paper, entitled *A Case of the Destruction of the Latent Image on Washed Emulsion, and its Restoration* [see page 604], a discussion took place on both papers.

Captain Abney observed, with reference to spots in emulsion plates, that though they were undoubtedly sometimes caused, as Mr. Cooper observed, by organic dust, he hoped to be able to show at the next meeting that dust was not the only cause, but that they arose from other circumstances within the ordinary experience of every dry-plate worker. Mr. Cooper, he noticed, attached great importance to heating the nitrate of silver and closing up the emulsion to keep the heat in; and further on he referred to the evaporating of the solvents to dry the pellicle. He (Captain Abney) did not see why these two operations should not be combined; that is to say, to evaporate the solvents by means of heat, and thus avoid the necessity of "cosying" up the emulsion. He was in favour of evaporating the solvents by distillation in preference to any other means. With regard to the lactate of ammonia used by Mr. Cooper, he stated that the crystalline deposit was probably lactate of zinc. He would recommend a modification of this part of the process. By the use of lactic acid instead of lactate of zinc, lactate of silver was formed and nitric acid set free, and thus the addition of nitric acid in a separate state was done away with altogether. He had found that by the use of albumen great delicacy was produced, though he had chiefly tried it in combination with albumen, the result being a formation of a double salt of silver. This combination he strongly recommended. The use of gallic acid he thought was not so good as sodium sulphite. Gallic acid was undoubtedly of great excellence, but he preferred always, if possible, using a mineral substance as a preservative rather than an organic one. In recommending albumen it might be thought he was contradicting himself; but it should be remembered that the albumen, in this case, was of a colloidal character, and not crystalline.

Mr. Sebastian Davis said that during the summer he had made some experiments with emulsion in a simple form. Instead of using the bath in the preparation of his dry plates he had used the emulsion, and then had proceeded according to the formula he had laid down in a paper read by him last session. This formula, by a singular coincidence, was very similar to that stated by Mr. Cooper. In using the simple cadmium bromised emulsion he had determined the exact quantity of bromide in solution by using paper impregnated with bichromate of potash in a similar form to litmus paper. This paper was dipped into the emulsion, and showed the presence of an excess of silver by turning red; bromised collodion was then added by degrees until a state of neutrality was reached. He (Mr. Davis) wished to draw attention to a defect in the emulsion process which he believed all workers in it had met with. This defect was a mottling in the higher lights, more apparent when the collodion was poured over the plate than when a bath was used. A reduction in the amount of pyroxyline had been recommended in the emulsion, and he had tried this plan of reducing the quantity from five grains to two grains per ounce. He had found that this reduction materially lessened the mottling; but he had not, owing to the bad weather, been able to test the method definitely, or whether it made any difference in the picture. He believed this tendency to mottling was the greatest difficulty the worker in the emulsion process had to contend with.

Mr. W. Bedford observed that his experience as to mottling was, that it was due to the quality of the pyroxyline. If it were of the proper quality there was no mottling, and by the emulsion process he had been able to obtain results equal to the wet.

Mr. Davis remarked that he had used pyroxyline made according to the formula recommended in the paper read before the Society, and other samples which were generally considered the best for the purpose.

Captain Abney said that it was a common practice with him, for the last two or three years, after emulsion had been standing and had settled down at the bottom, to decant half and add fresh solvents, and so get rid of half the pyroxyline. He was inclined to think, after a good many trials, that the emulsion was better if made with the full amount of pyroxyline and the latter lessened afterwards, although of course this method might be considered a wasteful one. If the pyroxyline were diminished it was necessary to use a preservative of some kind, or the plates would not keep. It should be remembered that the collodion itself was a kind of preservative from atmospheric influences.

Mr. W. Willis, Jun., then read a short communication—*Notes on the Platinotype Process.* [See page 605.]

In reply to the President,

Mr. Willis stated that gold could be used instead of platinum.

Mr. S. Davis inquired what was the composition of the platinum salt. The ordinary composition of the salt was 2KCl., Pt.Cl.4 forming a double salt or bichloride of platinum.

Mr. Willis said the salt he used was quite different, the formula being 2KCl. Pt.Cl.2.

Mr. Davis pointed out that if ferric oxalate were reduced by the action of light to ferrous oxalate, it would also be affected in bulk in a similar way to what it appeared to be in the pictures produced by the process demonstrated that evening.

Mr. Spiller apprehended that Mr. Davis wished to know whether the ferric oxalate was affected by light when in solution.

Mr. Willis: Undoubtedly. The ferric oxalate when in bulk or solution is reduced by sunshine to ferrous oxalate, and carbonic anhydride can be seen making its way to the surface until the ferrous oxalate is thrown down. The action of light on this salt is quite independent of any organic substance whatever.

Mr. Davis: It would be necessary then to prepare the ferric oxalate out of the influence of light?

Mr. Willis: Yes; and to store it in the same way.

Mr. Davis: The ordinary salts as purchased would not answer the purpose?

Mr. Willis: It is of no value whatever.

Mr. England: Do the prints require much washing?

Mr. Willis: About ten minutes after removal from the ferric oxalate, and about three changes afterwards of ten minutes each.

Capt. Abney observed that the ferric oxalate was one of the earliest photometers used. Draper somewhere about 1840 showed that the ferric oxalate in the presence of light was gradually reduced to the ferrous state. The amount of carbonic anhydride given off was measured to find the intensity of the light. He (Capt. Abney) had largely experimented with ferric oxalate, and was very much astonished to hear that the prints would keep between exposure and development. He had noticed that in thundery weather the ferric oxalate was very readily reduced, and he had sometimes been enabled to develope prints within so short a period as an hour after exposure.

Mr. Willis thought this rapid deterioration might be explained by the fact that oxidation only took place when a certain amount of moisture was present. Ferrous oxalate was soluble in an acid solution of ferric oxalate, and when this condition was produced by moisture in the paper the picture was destroyed. If two pieces of paper were prepared, and one kept in a chloride of calcium tube, and the other left in the room (say) where the meeting was then being held, in the course of a week the one in the room would be found to have almost entirely lost its impression. One could imagine that when the salts were lying side by side the slightest alteration would be sufficient to set up decomposition. He had always found that pictures kept for a time in presence of moisture had faded. The prints exhibited that night had been exposed on the previous Friday and had been kept since in a dry atmosphere.

Mr. Jabez Hughes thought that Mr. Willis had scarcely done himself justice in one important particular. When the process was first introduced to the photographic world it was felt there was in it a weak element arising from the use of a secondary action by means of silver, and to get rid of the silver the use of sodium hyposulphite. Now, in the process shown that night this weak element had been eliminated, and it must be admitted that this was a distinctive feature of advancement. He thought that in justice to Mr. Willis this fact should be acknowledged.

Mr. E. Cocking then read a short paper *On the Subjective and Objective of Pictorial Photography.* [See page 606.]

The President remarked that the last photographic exhibition was to his mind a proof that photographers had kept the principles advanced by Mr. Cocking in view. He considered that, from an art standpoint, the last exhibition had been a great advance upon its predecessors.

The meeting was then adjourned to Tuesday, January 14, 1879.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The annual dinner of this Society took place on Tuesday, the 6th instant, at Mrs. Main's, "Peacock" hotel, Newhaven; but owing to the unfavourable state of the weather the company was not as large as it otherwise would have been. Mr. W. H. Davies, one of the originators of the Society, occupied the chair, and Mr. M. G. Dobbie, Honorary Secretary, acted as *croupier*. The dinner was served in Mrs. Main's best style, and ample justice was done to it by the company, whose appetites were sharpened by the strong nor'-easter which was lashing the Firth into fury and rendering the roads almost impassable by snow-drifts. On the removal of the cloth,

The Chairman, in a neat and humorous speech, gave the first toast —"The Queen and Members of the Royal Family." Before doing the honours, however, he remarked that the gentleman who drew up the programme must have been napping here, for was it not a fact that Her Most Gracious Majesty was something more than a Queen—was she not also an *Empress?* Therefore, the toast should be, "The Empress and Members of the Imperial Family." (Cheers.)

The next toast, "The Army, Navy, and Volunteers," with, of course, the Reserves, was responded to by Messrs. Young and Pringle.

The toast of the evening, "The Edinburgh Photographic Society," was given by Mr. Robert Russell, who remarked that, though not a professional photographer, he took a deep interest in their beautiful art-science, and his experience assured him that the Society was one of the most influential in the empire. It did its work right well and thoroughly, and its popularity and great success were ample proof of his statement.

The Chairman, in responding, alluded to the work which had been done by the Society during the nineteen years it had been in existence, and trusted that the honourable name already acquired would be sustained in the future.

Mr. Alexander Mathison, in replying to the toast of "The Office Bearers and Members of the Council," said that he was gratified to find that it had been determined to give another presentation print this year, as he believed it to be a great stimulus to subscriptions, the picture alone being worth the whole subscription. By thus acting liberally he was certain the membership would still increase, whilst the funds in his hands would not suffer.

The next toast was proposed by Mr. F. P. Moffat—"Photographic Literature."

The Chairman, in replying, said there was a vast number of volumes of what was considered to be photographic literature—quite a library, in fact—dating from the time of Sir Humphrey Davy to the present day. He was afraid that during the last three or four years this class of literature had been distinguished more by a multiplication of words than ideas; still there was a demand for literature relating to photographic art, and publishers and printers found a ready market for their publications, who, after all, were simply carrying out the law of supply and demand. One work he would like to see reprinted—and he was sure it would have a successful run—and that was Cuthbert Bede's *Contributions to the Comic Literature of Photography.*

The Croupier, in a flowing and characteristic speech, gave the toast—"Kindred Societies"—which was responded to with all honours.

During the evening Messrs. Pringle, Howie, Moffat, Young, Hannah, and Reid entertained the company with some capital vocal and instrumental music.

Mr. Howie proposed the health of the Chairman, and the meeting separated, satisfied that the evening had been agreeably and profitably spent.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

A meeting of the above Association was held in their Rooms, 172, Buchanan-street, on Thursday, the 12th inst., there being a fair attendance of members,—Mr. Urie, in the absence of the President, occupying the chair.

The minutes of the previous meeting having been read and approved of,

Mr. Paton, of Greenock, was asked to practically demonstrate the carbon process and chromotype printing *à la* Lambert. For this purpose Mr. Paton had brought all the necessary materials, and from sensitising the tissue to stripping the finished prints from off the glass went through all the manipulations. The meeting took a conversational turn, Mr. Paton inviting inquiries as he went along.

At the close of his demonstrations some of the members remarked upon the beauty and simplicity of the process, and complimented Mr. Paton on his unvarying success in obtaining beautiful results.

The Chairman expressed the opinion that, perhaps, not a little of the demonstrator's expertness lay in his being a successful enamel worker previous to adopting carbon. He (the Chairman) also thought that if carbon enlargements could be produced *directly* from small transparencies by means of a strong light a great advance would be made. He had heard they had been so produced by the electric light, but fancied it possible by sunlight also.

A hearty vote of thanks having been awarded to him,

Mr. Paton replied by saying he felt more than repaid for any little trouble he had been at by the kindly and attentive manner in which the members had received him. In answer to the Chairman he said he had tried enlarging direct on to carbon from a small transparency, but his success had not been such as to tempt him to repeat the endeavour. He thought it a great mistake and pity that some Lambert licensees had not persevered a little more, and ultimately adopted carbon printing, as the process was simplicity itself.

Some specimen prints of cattle, taken by Newton's dry-plate emulsion process, were shown by Mr. George Mason, of Sauchiehall-street. It was quite evident the pictures had been taken instantaneously, and showed clearly that extreme rapidity was obtainable by this emulsion.

A vote of thanks to the Chairman brought the proceedings to a close.

Correspondence.

MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.

THE usual monthly meeting of the Photographic Society of France was held on Friday last, the chair being occupied by M. Davanne, President of the Committee of Administration. M. Peligot expressed by letter his regrets at being unable to preside. [The latter gentleman has since received a distinguished decoration from the King of Italy in testimony of the high appreciation in which his scientific services rendered at the exhibition are held in Italy.]

M. Marres, painter, and Captain Jolly were unanimously elected members, and MM. Raoult, Stebbing, Thoroulde, and Vandesmet were proposed for a like honour at the following meeting.

M. C. Fabre, Hon. Secretary of the Photographic Society of Toulouse, wrote to "reclaim" the priority of publication of the employment of nitro-glucose in collodion emulsions, in consequence of an article by M. de Pitteurs, published lately in THE BRITISH JOURNAL OF PHOTOGRAPHY and the *Bulletin*. The following remarks, so unusual under like circumstances, were received with applause:—Although M. Fabre was an unsuccessful competitor in the *concours* of the Society for the best dry process, he had the rare candour to acknowledge, and begged loudly to proclaim his opinion that the commission had done justice in the award it had made; and he complimented, in well-chosen terms, M. Alfred Chardon, the successful competitor, stating that he thought the theory of the emulsion process, put forward by that gentleman, was the best published, and consequently experimentalists need only occupy their attention in endeavouring with M. Fabre to improve the manipulations of the process. He begged the Society to publish in the following number of its *Bulletin* the description of the process sent by him to the *concours* in December, 1876, so as to establish his rights, seeing that every month claims were made and published of principles and details submitted by him at that date.—This request was referred to the Commission on Emulsions and to the Committee of Redaction.

M. Pector, in the unavoidable absence of M. Perrot de Chaumeux, secretary for foreign correspondence, read the extracts from the foreign journals, amongst which was the formula supplied by Mr. Morgan as that of M. Boissonnas, and first published in THE BRITISH JOURNAL OF PHOTOGRAPHY a short time ago. This was followed by the not uncommon experience related by Mr. F. A. Bridge, and taken from the same source.

Mr. Gutekunst, of Philadelphia, sent for the inspection of the Society a series of *cartes*, album portraits *en buste*, vignetted upon a tinted background, the high lights strongly defined, and very well executed; this artist was awarded a silver medal, for, amongst other productions, the accessories and backgrounds of his negatives, which were engraved with the needle in the manner of etchings, and which by contrast gave a remarkable degree of softness and harmony to the face and other parts produced by pure untouched photography.

M'dlle Assis, of Bordeaux, forwarded to the Society a stereoscopic proof made under the following circumstances:—She exposed a dry plate for an hour in dull, cloudy weather, the sun shining for an instant only in an interstice between two clouds, and, notwithstanding its extremely short appearance comparatively to the long exposure given, it was most curious to observe that the shadows projected by the sun upon the landscape were really well rendered in their proper value; but the sun was not sharply defined, the focus having been made on the nearest objects, and it was, therefore, altogether out of focus.

The *concours* established by the Society for the best substitute for glass as a support for the sensitive films of emulsion or dry processes suitable for amateurs, and to be used in travelling in foreign parts, will close on the 31st of December, 1878, and for which the grand medal of the Society will be given. There is at present but one competitor, namely, M. C. Fabre. The members of the Commission on Emulsions were charged with the decision.

M. Castellano exhibited some charming views, about 12 × 10, of the borders of the River Marne, which he had taken by the emulsion process of M. Alfred Chardon, and the fine, artistic feeling of M. Castellano was much admired.

M. Pinard, professor and photographer of the National School of Medicine at Nantes, sent for inspection a marvellously-fine album containing a great number of coloured anatomical and medical studies taken in the laboratory of the college, which showed most decidedly the great advantages of the truth and fineness to be obtained by photography when directed by a master in the art, and which the hand of the designer could not rival or even approach. Thanks were voted unanimously for this important application of photography to medical science.

M. Vidal, suffering from indisposition, begged the Chairman to present for him several specimens of his process of phototypy in two tones after the designs of Giacomelli, forming a new publication called *Ailes et Fleurs*, the cost, including the mounting on Bristol board, the text, and the profit comprised, was 3½d. per plate of about 12 × 9 inches. The work of M. Vidal, which reproduced so well the individuality of the artist, merited the approval it received; but *la couronne du bouquet* was the first ten numbers of the *Tresor Artistique de la France*—a magnificent undertaking, absolutely unique in its style, comprising the principal rich works of the national museums and the most remarkable private collections, reproduced by the photochromic process of M. Vidal, with the special authorisation and patronage of the minister of Public Instruction and of Fine Arts, and under the direction of M. Paul Dalloz. The proofs are in colour, in silver, steel, bronze, and in all the materials of the objects of art gracing the Gallery of Apollo in the palace of the Louvre. To show the facility at which the inventor has arrived in the execution of his patent, he said that for a proof of about ten inches, with an impression of a thousand, at the same time varying the colours and metals employed, the price is not more than 6½d. to 10d., the mounting on Bristol board excepted. It is the industrial arts especially which should profit from the publications made by the aid of this unique method of reproduction.

Many specimens of Mr. W. B. Woodbury's recent improvements in his photographic films were laid upon the table and excited the interest of the members to such an extent that nearly all of them were "appropriated," and the looks of Mr. Woodbury's representative at the close of the meeting was as "small" as the remainder of the proofs found upon the table. M. Davanne, who had exhibited some pellicular proofs several years ago, said that Mr. Woodbury had made such progress with his process as to render it a commercial success.

M. Ferrier, one of the oldest, if not the oldest, of the workers in stereoscopic photography, exhibited a number of slides produced upon plates prepared by the Taupenôt process in 1863, which had been kept for fifteen years without more than usual care but in a dry place. These had been lately exposed in the stereoscopic camera, seven days after being immersed in an aceto-nitrate of silver bath followed by washing in water, and the negatives were of rare excellence, showing the value and rapidity of the old process. Several negatives were exposed, quasi-instantaneously, in the Champ de Mars and the Trocadero, with clouds and natural skies. The fine definition of objects in the different planes of perspective, so necessary for the stereoscope and sometimes lost in other processes, is a well-known quality in the old Taupenôt process. It is to be observed, in connection with the development of these instantaneous negatives, that after the ammoniacal application warm pyrogallic is flowed over them, which brings out the image and strengthens it. The positive slides on glass, by the albumen process, with beautifully-rich colours, were in the best style of the veteran artist, and the whole bore conclusive testimony that his hand had not lost its cunning.

M. E. Lamy presented a little instrument which he called an "actinometer," intended to measure the action of the light during the exposure and printing of carbon paper, and made some remarks upon its application, which will be reproduced in next number.

Asnières (Seine), Paris, December 17, 1878. W. HARRISON.

A RELIABLE DRY PROCESS.

To the EDITORS.

GENTLEMEN,—My health not allowing of my being in London at this season, my paper on *A Reliable Dry Process* was read for me by my brother, and I was thus prevented from hearing and replying to Captain Abney's remarks at the late meeting of the Photographic Society of Great Britain.

Captain Abney agrees with me as to the importance of using heat during the preparation of the emulsion, and suggests distilling off the solvents. This is a plan I have not yet tried; but I invariably use heat in evaporating the solvents by standing the dish containing the emulsion on a large hot-water tin. This has for so long been a part of my ordinary practice that I rather stupidly forgot to mention it in my paper. As to the substitution of lactic acid for the ammonia salt, I have purposely used the latter, so as to avoid the presence of free nitric acid to any perceptible amount in the emulsion during the progress of its ripening, and I should not care to add the lactic acid as a final dose, wishing to have the lactate of silver in contact with the bromide from the first.

I rather regret that a rule of the Society necessitated the cutting out of the name of the maker of the pyroxyline I recommend. There are many sorts in the market, and each maker's has some very distinctive features. The one I use in my process is retailed at one shilling per ounce, and is, therefore, a low temperature cotton It is perfectly soluble to the extent of ten grains to the ounce, and gives rather a tough film, being very suitable for enamelling, but not for some other purposes. I really cannot see any harm in my mentioning that Messrs. Hopkin and Williams are the makers.—I am, yours, &c., HENRY COOPER.

Homehurst, Torquay, December 14, 1878.

P.S.—I hope soon to have something more to communicate on the effects produced by the reduction of the proportion of pyroxyline. This weather is sadly against comparative work in the camera—the only kind I really trust; but I may say my experiments are so far very satisfactory.—H. C.

CAMERA FRONTS.

To the EDITORS.

GENTLEMEN,—Will you permit me to add my testimony to the efficiency and convenience of the camera front as suggested by Mr. Baynham Jones last week? I have used one made on that principle during the last two years, and nothing can be better or simpler. I was indebted to Mr. Jones for the idea, and Mr. Lancaster, of Birmingham, carried it out very satisfactorily. In addition to its other good qualities the cost is small.—I am, yours, &c., G. SMITH.

The Castle Hill, Dudley, December 14, 1878.

EFFECT OF PETROLEUM ON CARBON TISSUE.

To the Editors.

Gentlemen,—As a sequel to a communication on the effect of petroleum stoves on carbon tissue I wish to communicate the following:—A short time ago the tissue which had been sensitised during the evening was, through the carelessness of an assistant, submitted to the effect of gas during the whole night. The gas was turned off and turned on again while the tissue was wet, and it dried in that atmosphere. Of course I expected that it had become insoluble, but it worked as well and developed as easily as ever. The tissue was so well impregnated with it that it exhaled the odour of gas an hour after it had been removed from the room.

Some of the tissue intended for the solar camera had been sensitised with five per cent. of bichromate; and in such tissue the tendency to insolubility is much greater than in that prepared with one or two per cent. of bichromate. It would be interesting to know what would have been the effect if the gas had been kept burning all night, instead of escaping. I have, however, had gas burning for two or three hours in the room where the tissue was drying without observing any ill results.

I cannot avoid thinking that the effects of gas on sensitised tissue have been somewhat exaggerated. The great causes of insolubility are, I believe, heat and moisture, and they generally exist together in this region.—I am, yours, &c., Charles Waldack.

Cincinnati, December 3, 1878.

RECENT MEDAL AWARDS.

To the Editors.

Gentlemen,—I know nothing of the details of Mr. Jennings' busiuess management. I sent my friend's order to an agency firm to execute, and heard no more till informed of the unsatisfactory result. As some people in India have also wanted prints, apparently two people have been victimised.—I am, yours, &c., H. Stuart Wortley.

Rosslyn House, Grove End-road, London, N. W., December 16, 1878.

THE LUXOGRAPH TESTIMONIAL.

To the Editors.

Gentlemen,—It has ever been my policy as well as my endeavour to avoid entering the arena of controversy, which I am now most reluctantly compelled to do, owing to the extraordinary statements in your last issue of Mr. Robert Faulkner, the eminent photographer, and a gentleman whom, until now, I had held in high esteem. If he consider that he has suffered in status by my having stated that he was in my company when we both visited the office where we saw the pleasing iliustrations of the nowadays indispensable luxograph, will he permit me to apologise very humbly for having wounded his susceptibilities?

But to come to the facts. Unless I have entirely lost my knowledge and appreciation of the English language, Mr. Faulkner really did express his admiration in terms so very unmistakable that I myself, further fortified by the fact of Mr. Gregson ordering an apparatus there and then, was induced thereby to intensify the decision at which I had arrived respecting the desirableness of ordering three of these instruments—one for each of my studios. Nor was Mr. Faulkner's enthusiasm very short lived; for I am assured that his assistant, Mr. Ross, who was also present at the demonstration on the evening in question, was sent by Mr. Faulkner, and actually waited subsequently upon the patentees of the luxograph, offering one-half the ordinary price in cash, one dozen of his cabinet portraits as specimens, and a *splendid testimonial*, if they would give him an apparatus.

It appears, however, that Messrs. Alder and Clarke did not place such a high value upon the professed "splendid testimonial" as did Mr. Faulkner himself, for they did not accede to his terms. *Hinc illæ lacrimæ dolorosæ.*

That the luxograph is a great success is plainly evinced by the evening demonstrations to an ever-increasing number of delighted photographers who, from all parts of the country, come to see, to approve, and to order.

I think it is a great boon to us all, and, without expatiating upon the superiority of the luxograph over any existing apparatus to photograph by artificial light, let me advise my brother artists to go and see it and judge for themselves.—I am, yours, &c., Lombardi.

13 *and* 14, *Pall Mall East, London, December* 18, 1878.

EXCHANGE COLUMN.

Wanted to exchange, Sarony's head and body rest for a Harrison's head-rest.—Address, Forshaw and Coles, photographers, Oxford.

ANSWERS TO CORRESPONDENTS.

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

PHOTO-MECHANICAL CORRESPONDENCE.

S. Smith.—A suitable press will cost about £5.

E. Lake.—You will find the process easier than you appear to consider it. Use a rather thick and close-grained paper.

Carbon.—The reversal of a lithographic image, so as to make the whites black and the blacks white, is not very easy in practice. It would be better to make a transfer from a photographic transparency of the subject.

GENERAL CORRESPONDENCE.

W. W.—Let the reflector be of a spherical form. The parabolic form is quite worthless for the purpose named.

W. J. Gates.—The ignition of phosphorus as described will prove an excellent means for effecting your purpose.

B. O. T.—See an article on the subject in our Almanac for the present year. To this we have nothing at present to add.

Photo.—Thanks for your flattering remarks; but it is not intended to have such a series as you mention in the Journal.

B. S. P.—No other medals were awarded than those published by us. On the other matter we must decline to enter.

John Hancock.—We cannot suggest any fault in the pictures save the presence of a degree of contrast seldom to be found in nature.

Argus.—The work about which you inquire was published in 1865, in the form of an appendix to the principal work. Both are now out of print.

Enamelled Paper Prints.—Messrs. H. and E. Schonewald, of Liverpool, have sent for our inspection samples of their work in this style, which is quite equal to the best that we have seen.

S. P. P.—Dissolve the salt in the smallest quantity of water in which this can conveniently be done. Then add the albumen, and churn the whole up until it assumes the appearance of a frothy mass.

Thos. M'George.—Do not waste your time at present in trying to restore the old bath, but make a new one for immediate use, and then employ your spare time in putting the other into good working order.

E. S.—It will be advisable for you to strip the films from off (say) one hundred of the negatives, and by fusing the silver contained therein and carefully weighing it a tolerably accurate estimate of the whole may be formed.

H. Barlow.—Thanks for enclosure. In reply to your queries:—1. The prints mentioned do, unfortunately, fade—2. The transparencies enclosed are well adapted for enlarging; but it would be better not to carry the intensification quite so far.

Michael Riley (Belfast).—To dye your client's hair of a black colour apply first a solution of nitrate of silver and afterwards diluted sulphide of ammonium. This latter application will necessitate a further purchase of some strong aromatic preparation.

J. Wilson.—The focus of the lens is too long by three-quarters of an inch. This may seem to be very little to you, but if you refer to the table of enlargements in our Almanacs it will be seen that it renders necessary the further extension of the camera to something within a fraction of two feet.

E. H. A.—Having obtained a new sample of paper from the firm mentioned we tried it thoroughly and found it to work quite as well as a supply we had from the same firm last summer. It is probable that there must be something in the conditions under which you work that militates against your success. We have never experienced a failure with it.

F. S. Smith.—The difficulty may easily be surmounted. Pour upon the black varnish a little benzole to soften the asphaltum, lay a plate of glass over it for a few minutes to prevent the escape of the benzole while it is acting the part of a solvent, and then apply more until the whole of the black varnish has been removed. No fear need be entertained that the picture will suffer, for collodion is unaffected by benzole. When the image has been cleaned in this manner a transparency should be taken from it, and from this transparency must be obtained a printing negative which may be either larger or smaller than, or the same size as, the original.

Pont-y-pais.—Mr. Hadow's method of recovering silver from old baths consisted in adding to the negative baths an excess of chloride of sodium, old hypo. baths being treated in like manner with sulphide of potassium. The resulting precipitates, after having been washed and dried, were mixed with two or three times their weight of nitre (nitrate of potash), and a portion of this mixture was placed in a hollow formed in a block of wood and set on fire by thrusting in the end of a red-hot stick of wood. When deflagration had fairly commenced the remainder of the mixture was added by small quantities at a time. The whole is then scooped out and hot water employed to remove the soluble salts, leaving the silver in a spongy condition. To reduce this into a compact mass mix six parts of nitre, two parts of fine sawdust, and one part of powdered sulphur, and place a small quantity of this in an iron ladle with alternating layers of the insoluble silver. Upon applying heat the mixture burns with an intensity so great as to reduce the silver almost immediately to a compact button at the bottom of the ladle.

Royal Appreciation of Photo-Enamels.—We understand that, on Wednesday last, Mr. A. L. Henderson attended at Marlborough House, on a special summons, to receive the commands of H.R.H. the Princess of Wales, relative to the immediate production in enamel of a photograph of one of the members of the royal family. It is gratifying thus to find that the undoubted value of photographic enamels is much appreciated in high quarters.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 973. Vol. XXV.—DECEMBER 27, 1878.

THE PAST YEAR.

The time has once more come round when the duty devolves upon us of reviewing the noteworthy occurrences of the past twelve months, and though, as in previous years, we have nothing of a more than ordinarily interesting character to record, still in some respects the year 1878 has witnessed changes which, if not productive of much immediate progress, afford the prospect of future improvements in our art-science.

Though not directly connected with photography, the subject of electric lighting may be mentioned as one of the more prominently distinguishing scientific features of the year, and from its possible bearings upon photography we cannot but feel deeply interested in its future. Without venturing an opinion as to whether it will ever supersede gas, there cannot be a doubt as to the advantages, in portraiture at least, which are likely to accrue to photographers from its introduction in a really practical and convenient form. Its capabilities in that direction have been already clearly established, and all that now remains to be done is to simplify the apparatus required for its production, and to reduce the cost sufficiently to permit its general use. Meanwhile a simpler means of arriving at the same end—namely, the production of portraits by artificial light—has been placed within the reach of all by Messrs. Alder and Clarke, whose "luxograph" has been recently fully described in our columns.

Another feature of a more purely scientific character, to which we have had occasion to allude in our present volume, is the liquefaction of oxygen, hydrogen, and nitrogen, which have hitherto defied all the efforts of chemists to compress them into the liquid form. Whilst all other substances usually existing in the gaseous form had succumbed to suitable treatment, the three gases mentioned had remained refractory, until MM Pictet and Cailletet succeeded in solving the problem of their liquefaction. As an example of the triumph of science over apparently insurmountable difficulties, the successful results which have crowned the persevering efforts of MM. Pictet and Cailletet cannot fail in fixing the attention of all interested in chemical pursuits, while they further encourage us in the hope that some of the knotty points more immediately connected with photochemistry may in like manner succumb to the persevering efforts of our scientists.

Turning to practical photography, the department in which the largest amount of energy has been exhibited is in connection with carbon printing. This is, perhaps, mainly owing to the fact that, in February of the present year, some of the patents connected with the carbon process were thrown open to the public. Opinion may be divided on the subject of the general working of patent rights; but we think that in the case in question the existence of such rights has proved of real benefit, not only to the process itself but also to photographers. Had the carbon process been entirely free from restrictions (restrictions which existed only in name, as it happened) it would scarcely have been worth the while of any individual or company to enter into it as a commercial speculation, and we imagine no one would have taken it up with the philanthropic intention of demonstrating its capabilities without an adequate *quid pro quo*. Be this as it may, under the fostering care of the Autotype Company carbon printing has been raised to a firmly-established position, and it was only to be expected that the lapse of the patents would give a further impetus to its general adoption.

Early in the year Mr. J. R. Johnson—whose name is identified with many improvements in carbon printing—obtained a patent for further modifications, chiefly in connection with the mechanical phases of the process. The principal feature in the patent, however, was the substitution of alizarine for the fugitive colours formerly employed in the production of tissue of certain favourite "tones;" and the discussion which followed the introduction of this new substance elicited much valuable information on the subject of the permanence of carbon prints. Dr. van Monckhoven also made a communication to the Photographic Society of Great Britain, in which he recommended the employment of certain compounds of iron as the basis of the colouring matter of the tissue. Later we were able to lay before our readers, on the suggestion of Mr. J. G. Tunny, a hitherto unsuspected cause of the deterioration of carbon prints, traceable to the discolouration of the paper itself; and, thanks to the publicity thus given to a possible cause of danger, there is every likelihood that increased care in the manufacture of the paper will add to the permanency of this class of picture. While on the subject of printing we must not forget to mention Mr. W. Willis's further improvements in his platinotype process. By the removal of all necessity for the use of silver in the formation of the image, the last doubt as to the permanence of the results disappears, while their beauty as well as the extreme simplicity of the manipulations were fully demonstrated at the last meeting of the "Parent" Society.

In dry-plate photography, though we have nothing of a strikingly novel character to record, there has been more than the usual amount of attention given both to its theoretical and practical phases. In the former branch we again find Captain Abney in the front rank amongst our experimentalists. His contributions to our knowledge of the physical and chemical branches of the science have, as usual, been marked by sound practical sense, and bear evidence of an amount of patient research such as few are capable or willing to devote to a pursuit which must be considered in the light of a recreation. His communications to the Photographic Society of Great Britain, and in our columns, have thrown light on several hitherto obscure questions; and in the discussions which they have elicited the name of Mr. H. B. Berkeley must be honourably mentioned.

In the practical applications of dry plates the wonderful results obtained with gelatine plates are chiefly noticeable. The process formulated by Mr. Charles Bennett, while bringing in nothing of a specially novel nature, combines so completely all the best qualities of gelatine as to place his process far ahead of all others—not even excepting the wet process—in all cases where extreme rapidity, in conjunction with the highest class of results, is desirable. The degree of rapidity attainable is such that it has been found possible to produce photographs by means of the actinically-feeble light of gas or paraffine, as demonstrated by Mr. Bennett himself, and by Mr. W. Brooks, under circumstances already reported in our columns.

Mr. Henry Cooper—already well-known in connection with collodion emulsions—has also contributed his quota in the shape of a "reliable" emulsion process; and, though we have not yet had an opportunity of testing his new method, we have not the slightest doubt from our knowledge of Mr. Cooper's judgment and capability as an experimentalist, that it will be found to come up to all he claims for it.

In the practice of washed emulsions nothing of great moment has transpired. A discussion as to the comparative merits of washing and precipitation in the preparation of such emulsions has led to the enunciation of the opinion in various quarters that, though extremely convenient, and capable of giving results of a high quality within a short period of preparation, precipitated emulsions do not possess keeping qualities equal to those exhibited in the case of washed ones.

The greatest "fillip" which has been given to the practice of dry plates generally is, undoubtedly, the introduction of the ferrous oxalate developer, which, so far as present experience goes, promises to be the developer of the future. Its advantages are not so much in the direction of a better quality of negative, as in the production of equal results with a saving of trouble as compared with alkaline pyro.; and the substitution of this new developer will go far to reconcile professional photographers to the adoption of emulsion plates in studio work.

In wet-plate work the most noticeable novelty is Herr Obernetter's reversed negative process, which consists in a reversal of the usual conditions of the collodion and bath—the former of which carries the silver and the latter the haloid salts. This does not seem to have come into very general use, though we have heard it favourably mentioned in connection with enlargements. The instantaneous or "lightning" process of M. Boissonnas also has secured a footing, though there exists a diversity of opinion as to its advantages, and as it is a "secret" process it is beyond our function to criticise it.

In the way of apparatus and appliances we may notice a new portable camera by Messrs. Rouch and Co.; the pneumatic shutter of M. Cadett, and similar appliances by Messrs. Cowan and Weaver; Mr. Woodbury's arrangements for applying photography to military purposes by the aid of a captive balloon; and, lastly, Mr. W. J. Chadwick's new safety oxygen retort. In connection with the last-named it is to be regretted that such accidents as that by which Mr. Wrench lost his life still continue, and the fact only proves the want of some such appliances as those which have emanated from our Manchester friends.

The various societies still continue their good work—the "parent" one being decidedly on the road to improvement. Whereas but a short time ago the papers read were "few and far between," now a plurality at each meeting is the rule, and at the last meeting there were no fewer than four such communications. This is encouraging, and shows that a wider interest is being evinced in photography. A further incentive will be found in the recently-instituted "progress medal" of the society, the first of which was very properly awarded to Captain Abney; while, as an encouragement to the younger followers of photography the prizes offered out of the society's funds in connection with the technological examinations of the Society of Arts must eventually be productive of important benefits. The South London Photographic Society keeps up its "technical" meetings, which have proved so useful as well as interesting in their special line. If *all* exhibitors at these meetings be not fully satisfied with the results, it should be borne in mind that the very nature of the experiment precludes the possibility of concentrating general attention upon any one exhibit; the object is merely to pass in rapid review before the assembly any inventions or appliances of a novel character, leaving it to those interested to take subsequent means of becoming more closely acquainted with anything which may particularly strike them. It savours somewhat of selfishness, then, for any individual to claim a larger share of notice than his neighbours, or to feel aggrieved at not obtaining it.

Death has, as usual, been rife amongst the followers of photography, and many well-known names have disappeared from amongst us. In France, MM. Antoine Becquerel and Regnault, whose contributions to chemistry and the higher branches of the science have been many and varied, have been removed. Voïgtlander, the world-renowned optician, and in practical photography Braun, of Dornach, have paid the last debt. America supplies two names in Messrs. J. L. Gihon and W. H. Rulofson; while nearer home the list is swelled by the loss of Messrs. J. A. Spencer, Alfred Hughes, Thomas Lampray, and while preparing for press we are informed of the death of Mr. William Carrick of St. Petersburg.

In conclusion: let us express a hope that the year about to commence may witness an improvement in the present depressed state of business—not only in photography, but in all branches of commerce—and that 1879 may prove to all our readers a prosperous and

A Happy New Year.

THE LESSON OF THE FROST.

We make no doubt that, long ere this, the severe weather that is accompanying the dying days of the Old Year will have taught many a lesson on the effects of low temperature upon saline solutions; and, far and near, we hear of such disaster and trouble through the failure of water supply, and the stoppage of light by the thick blankets of snow which lie on roof after roof, that we think a slight rehearsal of some of the precautions adopted by "old hands" may not be amiss to our readers.

What to be done with the snow on the glass causes anxiety in the minds of many despairing photographers at the time we write, we feel sure, seeing that none will venture upon the roof in such slippery weather, the fate of poor Rulofson being fresh in their minds. The lesson to be learnt is to build the skylight with as steep a slope as possible, and to do as one far-seeing photographer we know of has done against this and other contingencies—laid down a firm footway all round the eaves of his roof protected by a light iron fencing, so that the most timid could walk without fear, whether for repairing the roof or, as at the present time, removing snow or other obstructions. The glass roof along the footway is also guarded by a narrow strip of wood to keep careless toes clear of the glass. In the particular case we allude to, the gentleman states that if he were constructing another similar arrangement he would cause the footway to project about six inches from the glass to enable the snow the better to slide away during a thaw.

Few there are who have not had burst water pipes this winter. It may be well again to remind our readers that it is not the *thaw*, but the frost, that bursts them; though until the frozen contents are rendered liquid by the flight of the frost the damage is not observed. So long as the water pipes are exposed to the action of frost it is not possible to take perfect precautions against its effects, though the well-known device of covering them with hay bands is a very good preventive; and, if combined with the ingenious expedient of letting in to the more exposed portions of the water pipe, at intervals, tubes of lead closed at one end, so as to form a cushion of air to relieve the expansion of the water caused by freezing, the danger of a burst is reduced to a minimum.

To pass into the dark room. What trouble is in store there if no means of artificial heat are in constant use! Chemicals frozen, bottles broken, and general difficulty of working at all! A paraffine lamp constantly burning is an excellent source of heat, care being taken to keep it from dangerous proximity to collodion or ether, and when it is used it is generally approved of.

A very important matter is the keeping the bath warm; and the suggestion, recently made in a letter in our pages, of using an india-rubber hot-water bottle for the purpose we know to be excellent, one photographer whom we could name having, to our knowledge, had the plan in use with great benefit for some years. It will be found that in cold weather, when the bath is at a lower temperature than about 45° F., a very considerable increase in the strength of the bath is necessary to obtain clean plates, and that with baths well used considerable time is required before they are fit to be put in the slide without fear of streaks being produced in development. With a temperature at all approaching 32° a strength of sixty grains will not be more than equivalent to the ordinary summer thirty-five grains, and an iron developer of forty will be almost equal under the same circumstances to twenty-five grains.

We may conclude these brief hints by a reference to a very peculiar case of failure that once occurred through a severe frost. A Winchester of bath was frozen in its containing vessel almost solid, and, being required for use, was placed in a warm place to thaw. As soon as it was melted it was poured into the bottle—all but a few ounces at the bottom, to avoid chance of sediment. It behaved most singularly. The plate would not "cream" in it, little beyond a faint milkiness being produced even after prolonged immersion. It was, therefore, set aside and a new one made. The cause of the failure—which was not discovered for some time—was very simple, and was owing to a peculiar and interesting property of freezing solutions, by virtue of which a salt which is held in solution remains dissolved while the water continues to freeze, and will always be found either in a residue of fluid or in that portion which is last frozen.

In the case of the bath the silver was contained in the few ounces of unfrozen liquid, which would be of considerable specific gravity; and as the mass of ice in the bottle (which would contain scarcely a trace of silver) melted the solution of silver would fall to the bottom of the bottle, and not mix without a considerable amount of agitation—the very point which was carefully avoided. With this singular experience we leave the subject in the hands of our readers, trusting that neither bursting of waterpipes nor other *contretemps* may have marred a Merry Christmas!

A SIMPLE and ready means of testing for free silver in emulsions has long been a *desideratum;* and though there are several methods in general use, none answer thoroughly to the requirements as regards ease of application. At the last meeting of the Photographic Society of Great Britain Mr. T. Sebastian Davis mentioned a most simple method adopted by himself which seems likely to answer its purpose in every respect, without adding anything to the already numerous troubles of the emulsion photographer; indeed, the only wonder is that the idea has not found an earlier exponent. We imagine there are few of our chemical readers who are unacquainted with Gay Lussac's bichromate test for soluble salts of silver—a method based upon the reactions of bichromate of potash (or other similar salt) in the presence of free silver. This has already, to a certain extent, been utilised for the purpose of detecting the presence of excess of silver in emulsions or dry-plate films; but it has never, to our knowledge at least, been reduced to so simple a form as that in which Mr. Davis places it before us. Briefly stated, the method we speak of consists in the employment of a "test" paper, prepared by merely immersing a sheet of any ordinary paper in a solution of bichromate of potash; this, when dipped into a solution containing an excess of soluble silver salt, at once strikes the well-known red-brown colour of silver chromate; and, while the colouration is so marked and characteristic as to leave no ambiguity in the result of the test, it is also more than sufficiently sensitive for all the purposes to which it is likely to be applied in connection with emulsion work. A word or two may be said, however, in qualification of what has recently passed, in order to avoid any misunderstanding with regard to the working of this test. It is quite possible that the bichromated paper may, upon dipping it into an emulsion *soon after sensitising*, show the brown discolouration denoting an excess of silver, while at the same time no such excess really exists. It is generally understood that the nitrate of silver added to the collodion in sensitising requires a certain length of time to enter into combination with the soluble bromide; and, if the test be applied before this combination is complete, the discolouration of the test paper may possibly lead to an erroneous judgment. It is, therefore, desirable to make sure that a sufficient time has elapsed for the thorough decomposition of the salts in the emulsion before applying the test. The presence of free acid also militates against the accuracy of readings obtained with the bichromate test; but whether the comparatively small proportion of acid likely to be present in an emulsion, under ordinary circumstances, will interfere with the estimation of the relative proportions of bromide and silver we cannot say; but at least we can put forward Mr. Davis's test as an improvement upon those already in vogue.

NEGATIVES AND ARTISTIC PHOTOGRAPHY.

[A communication to the Manchester Photographic Society.]

IT has not hitherto been the custom in this Society for the President to deliver what is called an address. I am not aware of any reason why it should not become so; but I think, for reasons which may be passed over, that it should remain a matter of option. There might be some advantages in such a custom, but no disadvantages. Every man has a train of thought peculiar to himself. Almost every one of us may take notice of something that others overlook, and may possibly be able to pick up a grain of gold where many would see only sand. This in itself would be a sufficient reason for the formation and continuance of photographic societies, and also a presidential address is a good introduction for a new President. I have no wish to adopt the functions of a teacher; I desire only to direct your attention to a few matters that have forced themselves on my notice during my rambles among the pleasant ways of photography, and in doing so I may, perhaps, seem more dogmatic than I wish to be.

Some good things have recently been said about negatives. The Editors of THE BRITISH JOURNAL OF PHOTOGRAPHY, for instance, have been discoursing *On the Qualities Desirable in a Negative*, and gave some valuable hints. I have also something to say about negatives—perhaps not new to many of you, but possibly so to some.

It has often occurred to me that many people, particularly young photographers, have an incorrect idea of what a good negative should be; and, in order to arrive at a fair perception of what it should be, I will first say what it should not be. It should, then, be neither black nor opaque. I have many times heard it said by gentlemen, when describing a pet process, that any amount of density could be obtained, even to blackness; and I have had negatives submitted for my admiration that were capable of producing only the extremes of light and shade in a print, yet they were said to be everything that could be desired. That is a favourite expression, but, for all that, a very misleading one. Whenever I find a photographer using it I have a desire to examine his results, so as to ascertain from them what his standard of excellence is.

Some people have a fancy for thin, pretty negatives, full of detail but without force, and quite unsuitable for the production of good paper prints although they would do very well for making lantern slides. Such negatives appear to me as if they were produced in films too thin to carry a sufficient weight of deposit to bring up the high lights. If any member will make a powder picture such as is used for enamels, and try to pick it up with a film of thin collodion, he will get at my meaning in a practical way. He will find that a thin collodion will take up a portion only of the powder, and leave the remainder.

A good negative should not be over-full of clear glass portions; there should be a deposit, however small, almost everywhere. Clear glass is in place just under the edge of a roof, or any similar part where a narrow cast shadow is met with, but not in any portion which is only in the shade. I like a negative fully exposed and fully developed, and, if taken by the wet process, on a collodion with a good body. A Woodbury transparency is a capital guide to the kind of transparency that is required in a negative, and slow development on a fully-exposed plate seems to me the proper way to obtain it.

Before I leave this subject I will ask you to take a walk about town and compare the best portrait work with the worst, and ask yourselves why the best is the best. Consider the subject quite apart from the question of arranging the sitter. I more than suspect that short exposures and over-intensification are the causes of the worst, and the contrary of the best. No after-treatment, as you know, can fully compensate for under-exposure. Intensification I look upon as an unmitigated evil; a correctly-exposed and developed negative does not need it. The best printing portrait negative I have was fully exposed, slowly developed with iron solution, and not intensified at all. It was intended for enamel work.

Now, when you know what a good negative is, and know how to produce one, it would be useful to you to study the rules of art a little, and if more than a little all the better. You may obtain a good photograph without any such knowledge. You might now and then get a good picture; but without some acquaintance with art rules you cannot reasonably expect uniform success pictorially. After the rules of art, a careful study of the best works in a black and white exhibition would be found immensely instructive. In works of that kind there is no colour to take the eye—all depends upon light, shade, and shadow, and their disposition. Shade and shadow are different things. Shade is that portion which is illuminated by diffused light, or that side of an object which is not in the direct light of the sun; while shadow is a place that would be in the full glare of the sun's rays but for the interposition of some object. Shades always carry detail, and shadows do so in a less forcible degree. High lights often possess less detail than shades. Light, shade, and shadow are absolutely essential to the production of a successful picture; therefore, never expose in the expectation of entire success unless these three requisites be present. Observe that the light and shade of a good picture are about equal in the surface they cover. When you set up your camera do your best to ensure similar conditions, and, if you have a choice of situation, walk round about your subject in search of this equal division of light and shade and of something else that I shall come to presently.

I once saw a number of gentlemen rush at a subject, and in great haste plant their apparatus and go to work. There were one or two cameras not far away, but it never seemed to occur to any of those who came with such eager desires to ascertain if there were any advantages to be secured by looking round. At one time I noticed four cameras all in a line before and behind each other, with the object in front of all. I think that was a mistake; but, perhaps, some people like to see cameras in their pictures! I do not, as I don't consider them picturesque objects, especially when the operator is under his black hood!

I have always found it best to spend some time in getting a knowledge of the locality in which I intended to work, and, if necessary, to spend a whole day in doing so. Of course if you are out for an odd day only you must do the best you can. It is very pleasant to have a companion when away for a week's work, but I have always done best when I have had no company but my apparatus and my pipe.

The rules of art that a photographer should observe are not very numerous, and for the benefit of those who do not know them, I will state them in my own way:—Avoid all lines that run parallel with the horizontal and perpendicular margins of your plate, such as a long wall or a railing. Avoid parallel lines in any direction whatever, either curved or straight. Never admit an object either immediately behind or above another; the effect is very bad. I once saw a picture, by an artist so called, in which he had placed the figure of a woman exactly before the trunk of a huge tree. I think I never saw anything so painfully out of place as the figure of that woman. Parallel lines were there. One object before another and one object above another were present, the impression conveyed being that some poor woman had been placed there and rolled in flat. You will find something of the kind in this group, taken at Hawarden, only the figure against the turret is both round and square, and these features, combined with the surroundings, tend to mitigate the otherwise bad effect.

In photographing long distances endeavour to get a bold object in the foreground, so as to send your distance back; and I would suggest something better than part of a tree, which generally turns out a black patch. If you have occasion to take a street or road scene, place your camera so as to include more of one side than of the other, and do not allow the distant centre of the street to be in the exact middle of your intended picture. Never permit a road to run out from your view; such an arrangement carries the eye out of the picture and away from that which is intended to be seen. Rather let the road steal quietly away at some distance from the margin of your picture.

Every picture should have a principal object, and that should be more or less distant from the centre. Do not attempt to include *too many* objects. A few bold, well-lighted, and well-balanced ones are more effective; for where too many are introduced the eye is embarrassed in consequence, and there is no rest for it. I have a drawing which includes a road on one side and a pretty tumbling stream on the other, and the eye wanders from one to the other without satisfaction. One principal object in a picture, like one theme in a musical composition, is more agreeable than two. Light, shade, and shadow are common to both, and parallels are objectionable in either; contrary motion is most satisfactory in both.

All these things have been said and written before, in different ways and by various people; but they somehow get overlooked. It is profitable, however, to turn them out for an occasional airing, especially as there are plenty of recruits constantly entering the photographic army.

Alluding once more to light, shade, and shadow: an artist friend of mine says:—"Mr. Black never lives next door to Mr. White; Mr. Grey always dwells between." In other words, severe contrast is to be avoided. By attention to the laws I have endeavoured to place before you a great deal more would be gained than some of you may imagine, and systematic attention to them for a time would speedily become habitual. I know they are sometimes disregarded for special purposes by experienced artists; but the results, like Gainsborough's *Blue Boy*, are pictures in spite of the violation, not in consequence of it. There some other things that landscape painters observe, and which landscape photographers might, perhaps, study with benefit either in the production of their negatives or during the process of printing. Atmosphere, for instance, is deplorably absent from most photographs. I have found a hot, still day most favourable to success in this direction; but it is necessary not to overstep the capability of the camera as regards distance. What is known in art *parlance* as "keeping"—that is, the preservation of relative distances—is another point that might claim some consideration from us. As far as I can see this cannot be obtained in photographs without a constant light. Shifting clouds that sometimes cast shadows on foreground and distance alternately are fatal to it.

Contrast both in form, line, delicacy of middle tint and depth of tone should be sought after. Variety is essential to ultimate satisfaction; to say nothing of perfection. There may be, to all appearance, an abundance of variety in a mass of shingle; but in a photograph it often looks like a stone wall. The eye is captivated with the colour of vegetation that occasionally shows itself more or less in such masses, or with the various colours of the stones themselves; and unless the ambitious photographer is careful to recognise light and shade without reference to colour he is doomed to disappointment. Colour is the most difficult thing we have to contend with; it is the syren that leads us on to failure if we trust it. Bright reds and yellows that are lights to the eye are black in photography. I sometimes think it would be profitable to arrange a number of different colours and shades and photograph them, noting carefully the result—not in the negative, but in the ultimate print. I never saw, to the best of my recollection, a photograph of a red-haired person, but I should scarcely think it would be at all flattering to the original.

I think I have said sufficient to lead you into a new train of thought as regards these matters in their connection with photography. It appears to me that we trouble ourselves too much about apparatus; we have too many mechanical contrivances to take our attention, like people who have heaps of books and don't read them. The frame is so rich that we miss seeing the picture in it. I do not mean to insinuate that efficient and sufficient apparatus are undesirable; but we could all do very well with a smaller stock than we have. Such things do not see and think, and seeing and thinking are what we should cultivate. We must remember that Galileo did wondrous work with a telescope that was a mere toy in comparison with what we have now. We should make the best use of the apparatus we have, and not defer the acquirement of art principles and artistic feeling until we can obtain better. By following this course we should be the better able to make an intelligent use of the "better" when we could get them. CHAS. ADIN.

CHADWICK'S NEW DUPLEX GAS LAMP.

[A communication to the Manchester Photographic Society.]

IN fulfilment of the promise I made at our last meeting I send you the following particulars.

On "taking stock" of Mr. W. J. Chadwick's new naphthalised coal gas lamp the two burners seemed to me to be too wide apart. As it was probable some alterations would be made in the lamp I deferred putting any porous material into the naphthalising box, as it would be worse to get out than in. As a substitute I placed the lamp on a hot iron when trying an experiment. To partly fill up the space between the two burners a small wedge-shaped tin box was made, having two rows of small holes near the thin end of the wedge, a piece of lead gas pipe being soldered into one side at the thick end. Upon trying how the thing would answer I got a very smoky flame from the two gas burners. A very gentle stream of oxygen being then allowed to issue against the inner side of each gas flame a very brilliant light was the result. The flames were ragged, and not sufficiently compact to put before a condenser. Instead of oxygen, coal gas or atmospheric air might be tried, just for information, before any alteration is decided upon.

The alteration I would make would be the addition of an intermediate naphtha flame fed by a cotton wick, getting its supply from the naphthalising box below. The capillary attraction of the wick would bring up a large supply of the volatile liquid, part of which would be burnt in the usual way, while another part would be vaporised by the heat, and help to still further increase the two gas flames. There should be a narrow passage on each side of the centre burner to admit air; this being done, I have no doubt you would have a very large, smoky flame, giving off any quantity of smuts.

As the lamp cannot be allowed to smoke, or any stimulant in the shape of oxygen permitted, when at work, in the interior of a lantern or sciopticon a powerful and well-arranged draught of air must be provided, so as to produce the best light and a clean flame. The centre wick-holder might be so arranged that when the wick is away a brass cap containing the same number of holes as either of the other burners have could be put on, so that there would be three gas flames all alike. If the pressure of the gas causes the naphtha to over-feed the wick and flow over the pressure would have to be reduced; if that reduced the efficiency of the two outside flames the holes might be "rimered" out larger to suit. Experiment alone can point out what is best.

To "break the lamp in" properly a gallery should be formed to carry a plain glass gas globe. On the top of this globe there should be a long chimney. Through the gallery, or bottom plate, suitable openings must be made. By having a gas globe you will be able to see all around the effect of the various inlets of air to the three flames before fitting the lamp into the place where it is to work permanently. The coal gas might be made hot before entering the box. M. Noton.

M. LAMY'S SYSTEM OF PHOTOMETRY.

The following is an abstract of the remarks made by M. E. Lamy at the last meeting of the Photographic Society of France, in explanation of the system of actinometry to which allusion was made in our last number by Mr. W. Harrison, our Paris correspondent:—

My system of photometry is used in connection with the method I employ of estimating in minutes of a good light at noon in the shade the printing force of a negative. The regularity of its indications depends upon the mode of preparation of the sensitive measuring paper; consequently I shall, in the first place, explain how I estimate the printing force of the negative, and afterwards how I prepare the sensitive paper.

In order to judge the printing force of a negative in minutes of a good light I choose three good negatives—one feeble, the second of good average force, and the third slightly over-strong. I print these three negatives separately, using my carbon paper No. 10, which is the most rapid for positives developed by the double transfer method, the tissue being sensitised on a bath at three per cent. Exposed *in the shade towards noon*, the most feeble portrait negative will generally require an exposure varying from six to nine minutes, those of average force from ten to thirteen minutes, and the stronger ones from fourteen to seventeen minutes. The three negatives are, therefore, exposed respectively for (say) eight, twelve, and sixteen minutes. After exposure and development the proofs are examined, when, if they be either too strong or too feeble, the operation is repeated, diminishing or augmenting the exposure by one or two minutes. When, after development, the right time has been hit with each of the three proofs, the number of minutes required to produce the result is marked upon each negative respectively.

Thus I have three types or models numbered for comparison, which can be framed and placed permanently at a window of the printing-room for inspection. This is the only trouble of any consequence which is necessary, for when it is once done the table of comparison is always ready to hand, and is capable of measuring easily, rapidly, and with exactitude the time for the printing of all negatives. Photographers who have to print from negatives, some of which have been obtained by wet collodion, others by the dry process, or even enlarged negatives, may, in order to render their determinations more accurate, establish tables of comparison with negatives by each of these processes.

To form a correct estimate of the value of a negative requiring numbering, it is compared with each of the types by transmitted light, and it is judged and identified as to strength with one of them. If there be a perfect assimilation with one of the types, a corner of the negative is marked with a label bearing the number of minutes corresponding to the type with which it accords. If there be not an exact assimilation it is readily seen whether it can be placed either in advance of the first or after the last, or between any two of the types, and an intermediate number of minutes marked accordingly on the label. The valuation having been made, and the negatives marked accordingly, they are then delivered to the printer, who, guided by the numbers and the actinometer regulated and numbered to correspond, can produce *at once*, and *without any previous trial*, proofs properly exposed and printed to a nicety.

The method of preparing the sensitive paper consists in immersing for ten minutes a sample of Rives' eight kilo. paper in the following bath:—Distilled water, 100 c.c.; chlorhydrate of ammonium, two grammes.

This plain salted paper (the back of which is first marked) is dried and then floated for four minutes upon the following silver bath:—Distilled water, 100 c.c.; nitrate of silver, twelve grammes; citric acid, six grammes. The citric acid gives to the paper the property of keeping white, and, however old it may be, its colouration under the influence of light is always *alike and equally rapid.* The specimen shown to the Society has been prepared three months, and is now as white as it was on the day of preparation.

The actinometer differs almost entirely from those in use up to the present time. Its comparative tint is a rosy grey, and it is by the aid of this one tint, concurrently with one or more glasses of varying depths of colour, that I obtain the necessary effect.

It is very important that the comparative tint be *unalterable*, inasmuch as it is composed of enamel colour applied upon a support of paper, which is pasted upon a coloured glass fixed in the opening of the cover to form the comparative table of the instrument, and pierced with an aperture, under and across which slips the silvered paper. A band of sensitive paper is rolled round an axle contained in the interior of the instrument, and is held in its place by a small spring; a short length is unrolled so that the end projects a little beyond the exterior, the cover is shut, and the instrument is ready for use. The reading of the tint is easy, and is made from the exterior, upon the table of the cover, without its being necessary to touch the instrument; the renewal of the paper which has been used is brought about by pulling out the end which projects, so as to bring a fresh portion under the aperture.

With the simple slip of wood which I hold in my hand I can explain more easily how I arrive by this system at an indication of widely-varying times of exposure. Upon it you see a piece of enamel-coloured paper, similar to the tint of comparison placed in the actinometer. Under this paper, which is pierced with a round hole, slides the band of silvered paper. If, in a good light, I expose the whole thus fitted up the silver paper, visible through the aperture, tints and assimilates to the colour of the test paper in ten seconds; but if I take a slip of glass of a light green colour, and place it over the opening through which the chloride of silver paper is seen, the latter no longer tints in ten seconds but requires fifteen. If I replace the light green glass by another of a shade a little darker, and I expose again in the same light, I find that the silver paper requires thirty seconds; and by trying in the same way all the coloured glasses of the green scale and those of yellow that I have in my hands, either one by one or combined two and two or three and three, you will see that I am in possession of a system with which I can indicate the different quantities of the action of a good light successively from fifteen seconds up to twenty-five minutes. For the indication of quantities above twenty-five minutes it is necessary to have a combination of coloured glasses of such intensity that the light cannot penetrate easily, so that to measure exposures above twenty-five minutes I am obliged to use successively two different actinometers, the sum of the indications of which would give me in minutes the total sought for, though there are very few negatives, especially of portraits, which require such long exposures. Each of my actinometers is thus regulated in *shade towards noon*, and the readings are based upon the retarding power which coloured glasses, singly or combined, exercise upon the darkening of the chloride of silver paper.

I have here a series of eight actinometers. The first assimilates with the comparative tint in six minutes and passes it in seven. The last of these actinometers takes the tint wished for in twenty minutes and passes it in twenty-five. Each instrument thus indicates two quantities of the action of a good light.

The Working of the Actinometer and some Observations Thereon.—For printing, the printing-frames of negatives marked with similar numbers—say seven—are exposed altogether, accompanied with an actinometer indicating the same number. Those negatives marked "ten" are also exposed simultaneously along with the actinometer of the same number, and so on with each series of negatives. The exposure of each class of negativs is stopped the instant the tint of the corresponding actinometer is accomplished. With this system, whatever may be the light, the impression is always perfectly exact.

If the exposure of the last batch of printing-frames for the day has not been sufficiently long before work ceases, or the light has departed, each series of printing-frames is taken to the work-room with its corresponding actinometer, and the exposure is continued the following day, when the operator will find that the prints have been done to a nicety.

The supposition that the impression of the image continues afterwards in the dark is, in my opinion, a great error. The gelatine impregnated with bichromate becomes so much harder in proportion as the keeping has been more or less protracted and the air more or less humid, or the opposite.

The carbon paper after being bichromatised for several days, whether it has been impressed under a negative for some time or has only just been exposed, necessitates, for the development, water heated to a relatively higher degree of temperature than the carbon paper has been kept at, according as the atmosphere is more or less humid, dry, or warm. In thus raising the temperature of the water to the degree which best accords with the circumstances one can always ensure that the image will be of the desired vigour and strength.

But if a carbon paper bichromatised and kept several days after it has been used be developed with water heated to the degree which suits paper freshly sensitised and exposed, the development takes place very slowly, and it is believed to be terminated when it is only partly so, and the washing being stopped too soon, the image thus obtained will appear to be too much printed.

With my instrument it is better not to print in the sun, otherwise its indications would be incorrect, and in consequence a stronger light should not be used than that which has served to regulate the actinometers. The scale of colouration of chloride of silver paper exposed directly to the rays of the sun is very different from that obtained by the exposure in the shade.

I have very recently observed, after the experience of several consecutive days during a temperature below freezing-point, that carbon paper exposed under a negative in the open air in a garden, and consequently subjected to the effects of cold, was a little slower in printing. To meet this special case I made use of an actinometer marked with a number one-fifth higher than that on the negative. This is an exceptional experience, which, I believe, may very usefully be made known.

Amongst carbon papers there are some which, in consequence of their density of colour in proportion to the quantity of gelatine, or from the presence of particular colours—such as blue and certain iron reds—do not print with the same rapidity; nevertheless, for these papers the base of the printing depends always upon the numbers on the negatives, such as I have indicated above. In this case, to be able to print exactly right, here is what is necessary:—Open, for instance, a roll of carbon paper containing blue (which is the slowest colour, and mixed with gelatine forms the best medium for obtaining harmonious images); take a piece and sensitise it upon the bichromate bath at three per cent.; when dry expose it under a negative along with the same numbered actinometer, then develope, and by examining the image it can be judged, by the experience gained in our profession, that to be properly exposed it would have required either one-fifth, a fourth, a half, two-thirds, three-fourths, or even double more. If it seem from this one trial that the printer cannot judge with sufficient precision he can repeat the experiment with an actinometer which he supposes will approach nearest to the impression required for the paper under trial. This done upon the outside of this and similar blue carbon paper we mark, the difference. If, for example, we have recognised that the image obtained is too feeble by half we inscribe on the roll "one exposure and a-half;" when, with the blue carbon paper thus marked, we wish to print a negative numbered "ten" we expose the printing-frame along with an actinometer marked "15," and in this manner up to the end of the sample of blue carbon paper we obtain the same perfect exactitude in the printing.

THE REACTIONS OF CHROMIC ACID AND CHROMATES UPON SUBSTANCES OF ORGANIC ORIGIN, CONSIDERED WITH REFERENCE TO THEIR USES IN PHOTOGRAPHY.*

The Behaviour of Gelatine with Reagents.

The behaviour of gelatine and chrome gelatine with reagents has already been partly described where it appeared to be necessary in order to preserve the connection of the subject, and by this proceeding the difficult-to-review-subject material has been divided.

In considering the action of chrome alum upon gelatine we find that chondrine is at once precipitated by heat, while gluten is not. I followed closely the somewhat developed phenomena of the reaction, because they throw a new light upon the process of photography with the chromates. A certain proportionate concentration must be maintained during the reactions, for gelatine solutions containing from twenty to thirty per cent. of gelatine, of whichever kind its origin may be, will be rendered very thick by chrome alum and will stiffen quickly. A five or ten per cent. solution of gelatine rich in gluten will not be precipitated from its solution by an excess of chrome-alum solution. It will not be visibly changed, nor will the solution gelatinise more rapidly than pure gelatine. Occasionally this addition will delay the gelatinising, but not for long. When the solution has stiffened it is still soluble in boiling water, but only slowly. After one hour, or even after twelve hours, the jelly gives off no chrome alum to the water, if the former was not added in excess, and it will now have become insoluble even in boiling water.

If the chrome alum added to the gelatine solution be equal in quantity to half the quantity of dry gelatine used, then when once the jelly has stiffened it will have become so well able to resist the action of boiling water that even boiling for several hours produces no solution. It is only after boiling from six to ten hours that the chrome-alum gelatine dissolves into a green fluid which no longer possesses, or scarcely possesses, the property of jellying. The shrunken, stiffened chrome-alum gelatine gives off, after digesting for days in cold water, some chrome oxide and a great deal of potassic sulphate, of which only a very small quantity is retained. If the water in which it is digested be now made slightly ammoniacal a great proportion of the sulphuric acid will be redissolved while the chromic oxyhydrate remains combined with the gelatine. The compounds of gelatine with the chrome oxide salts are insoluble in hot water, as well as that with chromic oxyhydrate.

A relatively smaller addition of chrome alum suffices to make the gelatine insoluble. Some ten per cent. of chrome alum to the weight of dry gelatine renders the jelly insoluble in boiling water, but does not produce that lasting resistance to its action induced by the addition of an equal weight of chrome alum. An addition of five or even two per cent. of chrome alum to the gelatine produces temporary insolubility, but in from a quarter to half-an-hour boiling water dissolves such gelatine. If a stiffened jelly of pure glue be digested with a solution of chrome alum it will become insoluble, and so will air-dried sheets of glue, when allowed to soak in a cold solution of chrome alum, become insoluble in hot water.

* Continued from page 583.

When gelatine, to which chrome alum has been added, once becomes dry it resists the boiling water much more obstinately than the jelly. If from ten to fifty per cent. of chrome alum be mixed with gelatine, and the dissolved mixture be allowed to dry up, the longest soaking in cold water will no longer cause it to swell, though boiling water still slowly produces a slight swelling. From one to three per cent. of chrome alum does not prevent the swelling caused by long soaking in cold water, though it is very slow, taking place faster the warmer the water is.

This insoluble mixture does not resist the continuous boiling with water for a whole day, but dissolves. Increase of the chrome-oxide contents also renders the same gelatine insensitive to water.

The behaviour of gelatine rich in chondrine is still more pronounced. It stiffens with chrome alum, even in a hot solution, and is then insoluble in boiling water. The boiling must be continued for a whole day before the once-stiffened mass begins to dissolve, otherwise both sorts of gelatine behave alike. If acetic acid be added to the gelatine solution before the chrome alum then the solution will not stiffen when cold; but when once the fluid dries up it will have lost its solubility in hot water.

Dilute hot muriatic acid, sulphuric acid, or nitric acid accelerate considerably the solution of stiffened gelatine and chrome alum. Acetic acid, even when boiling, has but little effect upon it. Hot potassic ley dissolves it very rapidly, even when very dilute; a solution of soda acts in a similar manner, though weaker. Strongly chlorine water, even boiling, has little or no effect; and calcic chloride has a moderate action. Potassic permanganate accelerates greatly the solvent action of boiling water by precipitating manganic peroxide. This solvent action is, however, but a secondary consequence of the decomposition of the potassic permanganate which separates into manganic peroxide and potassium, the latter of which acts energetically as a solvent. A permanganate solution, to which acetic acid has been added so as to combine with the potassium set free, dissolves chrome-alum gelatine very slowly; indeed, a jelly treated with it is even more insoluble than before. Potassic permanganate was first used by Swan[1] to intensify carbon pictures, and is now extensively used for that purpose.

The property possessed by chrome alum of rendering glue particularly insoluble has been generally known for a long time, but Swan[2] called special attention to it. He utilised the insolubility of chrome alum for waterproofing textile fabrics[3]; and he also proposed to use chrome alum for the production of an insoluble, gluey film upon the transfer paper used in the carbon process[4]; for which purpose Liesegang,[5] Vogel,[6] Monckhoven,[7] Phipps,[8] and others use it. Chrome-alum gelatine is also used in the preparation of photolithographic paper.[9] The addition of a small percentage of glacial acetate to the chrome-alum gelatine prevents its too rapid stiffening, and makes it more fluid without affecting its insolubility after drying.[10] Chrome-alum is also recommended for staining and hardening photogalvanographic gelatine reliefs[11] and carbon pictures.[12]

Though, for many reasons, the addition of chrome alum to photographic chrome gelatine is recommended, still, as it always lessens the solubility and renders impossible the development of the picture by dissolving out the unlighted gelatine, it is only necessary to consider its use in relation to lichtdruck plates. A moderate addition of chrome alum gives the gelatine more consistency and greater power of resisting mechanical pressure and friction. I proved that this really occurs with almost all sorts of gelatine, though in a greater degree in the case of some than with others, and I calculated the degree of hardness induced in a large number of varieties of gelatine (this point will be taken up again further on). A small addition of chrome alum makes the chromated gelatine very difficult of solution in boiling water, without wholly depriving it of its power of absorbing water.

Chrome alum presents many advantages for the lichtdruck process, since the films do not lose their sensitiveness to light, but, as some think, rather gain,[13] while the difference in insolubility and in respect to the power of absorbing water still remains sufficiently great, between the exposed and unexposed chrome gelatine, to furnish fine lichtdruck plates, and plates able to furnish a greater number of impressions. Thus the attempt to introduce chrome alum into lichtdruck is not without justification. Amongst those who recommend the addition of chrome alum to chromated gelatine is Edwards,[1] who mentions that lichtdruck plates to which it has been added do not show such a high

[1] *Phot. Archiv*, vol. xii., page 229.
[2] *Phot. Correspondenz*, vol. vii., p. 154. *Phot. Arch*, vol. viii., p. 384.
[3] *Dingler's Polytech. Journal*, vol. clxxxvi., p. 23. Compare also with the behaviour of dextrine with the chromates.
[4] *Phot. Arch.*, vol. viii., p. 384.
[5] Ibid, vol. xvii., p. 3.
[6] *Pigment Verfahren*, p. 43.
[7] *Kohle Photographie*, p. 60.
[8] *Phot. News*, 1872, p. 198.
[9] *Phot. Wochenblatt*, vol. iv., p. 13.
[10] Compare Vogel, *Lehrbuch der Photographie*, 1867, p. 370.
[11] Scamoni, *Handbuch d. Heliographie*, 1872, p. 77.
[12] Liesegang, *Kohledruck*, 1877, p. 32. Stefanowski, *Phot. Corr.*, vol. xiii., p. 128; Schleussner, *Phot. Monatsbl*, vol. i., p. 203; Honikel, *Phot. Arch.*, vol. xvii., p. 74.
[13] *Phot. Mittheilungen*, vol. vii., p. 169.
[14] *Phot. Arch*, vol. xi., p. 233. Ibid, vol. xii., p. 69.

relief after washing. Abney[1] and the Heliotype Company,[2] at Kilburn, have also used chrome alum for this purpose. Waterhouse[3] found that lichtdruck films containing chrome alum, though pretty hard, were apt to spring off the glass if the quantity of chrome alum contained was great. He prefers to add, for hardening purposes, chromate of mercury and lacs. It was apparently the effort to harden liehtdruck gelatine which induced Geymet[4] to boil the chromated gelatine for three minutes before spreading it upon the glass plate, as he lays stress upon this proceeding as adding to the firmness of the film.

When lichdruck plates have a solution of chrome alum carried over them the parts so treated take on black. In this way printing plates can, according to Waterhouse[5] and Voight,[6] be retouched.

Dr. J. M. Eder.

(To be continued.)

NOTES FROM THE NORTH.

One by one the ancient landmarks are being removed. This is true of photography, as well as of most other things; and we have an instance of it in a notice which appeared in a recent number of the official *Edinburgh Gazette*, which deserves more than a mere passing notice. There are few of those who have been privileged to watch the progress of photography, from its earliest dawn as a profession down to its present state as an institution in every civilised quarter of the globe, that are not more or less acquainted with the names of "Ross and Thompson," and more recently "Ross and Pringle." Mr. Ross, who had the advantage of being trained as an artist, was one of the fortunate few who, having taken up the new art enthusiastically, soon adopted it as a profession, and he is one of the still fewer whose career as a professional photographer has been in every way an unqualified and unbroken success. Those who had a personal acquaintance with Mr. Ross have no difficulty in finding the cause of his great success both artistically and pecuniarily. He had a high appreciation of, and an intense love for, art; and in his daily work seemed ever striving after an ideal perfection. Instead of trying merely to satisfy the tastes of his numerous patrons, who, though drawn mainly from the more cultivated classes, were in many cases somewhat deficient in art culture, he, by his suavity of manner and genial *bonhomie* which so peculiarly characterised him, easily led them on to do, and let him do, that which generally resulted in work of artistic as well as technical excellence.

Mr. Ross rarely, if ever, complained of dull times, and was as rarely to be found idle, delighting in experimenting with varied methods of lighting and posing, as if he had been a student fresh from the academy. In this way, and as the result of much well-spent leisure, he produced many exquisitely-beautiful gems that found their way all over the world, and many of which were from time to time reproduced as engravings in various illustrated periodicals. His suavity of manner, intensity of friendship, and open-handed liberality secured for him the affection and esteem of all who knew him; and, as he retires from business in what may still be said to be the prime of life, he carries with him their heartfelt wishes that he may long enjoy the repose that has by a well-spent life been so faithfully earned.

By an ever-active interest in all that concerned the welfare of his *employés* Mr. Ross gathered round him those who were both able and willing to do all in their power to aid in carrying ont his designs, and as each had the interest of all at heart, the changes in the *personnel* were comparatively few, and the work of the large establishment went on with an admirable smoothness. It will, no doubt, be satisfactory to all interested in good work and the continuation of time-honoured institutions, to know that in the hands of Mr. Pringle, who has been so long associated with Mr. Ross, the establishment is likely to retain its high character; for now, in a time of depression such as has rarely, if ever, been experienced in Scotland he is still able to find plenty of work for his willing hands.

I hope dry-plate workers iu general, and the less experienced of that now large body in particular, will "mark, learn, and inwardly digest" the remarks on development by Mr. Henry Cooper in his recent communication to the Photographic Society of Great Britain, as I think he sounds the keynote of success when he says—"Beware of strong pyro.; use it very light to begin with. * * * Use patience, and do not hurry. * * * The developer may be used almost like a painter's brush; and it is only by the intelligent and artistic use of all such means to an end that *pictures* such as a true artist would value can be produced by means of the camera." A few days ago I met with an amusing corroboration of Mr. Cooper's opinion of the benefit to be derived from the use of a very weak developer at the commencement of development. I called on a friend who had been fairly successful with collodio-bromide, and had recently taken to gelatine, but complained bitterly of being able to get nothing but "tame, flat, useless negatives." He was in his dark room, and as I entered exclaimed—"Eh! man! yer just in time! I've fairly mastered the billie noo, and ean gar him come oot wi' as muckle birr and beauty as a wet negative!" He was working 10 x 8 plates, and proceeded by making about two ounces of a three- or four-grain solution of pyro. with the addition of sufficient ammonia and bromide. After well moistening the plate under the tap he poured about two drachms of the solution into a four-ounce developing cup, and nearly filled it with water. With this he flooded the plate and watched the effect, commenting the while pretty much as follows; but, as under the least excitement he runs off into the vernacular, it is not easy in these degenerate days to carefully follow him:—"There! the billie come noo! Ye see he disna like to be driven; but just gie him his ain time and ye can make him onything ye like! He's rather weak i' the head, and canna stand strong drink to begin wi' without getting muddled all over. The fach is gelatine is a kittle billie, and canna stand muckle licht, and so ye'r aye gie'nt our muckle or our little, an' there's naething like a weak drink o' pyro. to begin wi' to gaur it tell its ain story." Holding the negative so that it might be examined by transmitted light, he continued—"Is'nt that grand? no' a trace o' muddling there!—as clear as clean glass, an' fou o' detail as the image on the focussing screen; an' it only wants a bit shirt here and bit great-coat there, to make it a perfect negative!" The "bit shirt" and "bit great-coat" were various degrees of additional intensity on the higher lights of the picture, and these were readily obtained by the partially local application of the undiluted solution wherever they were required. In this way, and with a consumption of not more than ten minutes of time, a negative was developed that not only gave a print full of delicate detail and charming contrast, but one that was itself beautiful to look at, and rich in the *bloom* so characteristic of the olden time when wet collodion and pyrogallic development were in vogue.

Of course I am aware that we have high authority for the use of very strong developers; and, in certain cases where the proper exposure has been accurately hit, I know that exquisite results may be obtained by its use. But even then an equally good negative may be got by the more patient method of slow action, and the intelligent operator who wishes to stamp his work with what Mr. Edwin Cocking has so well called the "subjective" of pictorial photography will find the method advocated by Mr. Cooper—accidentally hit upon by my friend already mentioned, and practised by some of the most successful dry-plate workers for many years—a most valuable means to that end.

It has been often observed that photographers are of a "conservative" turn of mind, apt to prefer something that has the flavour of age to such novelties as may be brought under their notice, and for such the method of slow development ought to have a charm. Some of my readers will remember that nearly twenty years ago a series of exquisite instantaneous seascapes, with vessels in full sail, were produced in Glasgow by (I think) Mr. Kibble. They were known to have been obtained on dry plates; but, so far as I understand, the process has never been published, the only information regarding them being that the development occupied a period of several days and nights. Another notable example of a believer in slow development was the late Mr. W. D. Clark, of Edinburgh, whose dry-plate work at the time of its production was far ahead of that of most of his contemporaries, and some of his pictures that lie before me while I write are still equal to anything that is being done at the present time. His method—which I published in this Journal more than a dozen years ago—was to use a developer so weak that a dozen hours or more were required to bring out the detail of the image, and sometimes three or four times as much to produce sufficient density. During that time the plate was frequently removed from the solution, washed, and dried, and such parts as were sufficiently intense varnished to protect them from further action and again returned, till the whole was completed to his satisfaction.

Notes of progress from the North are at present difficult to obtain. The commercial crisis consequent on the failure of the ill-fated City of Glasgow Bank has cast a gloom over society generally, and photographers, amongst others who minister to the luxuries rather than to the necessities of the public, are the first to suffer. The complaints regarding dull trade are both loud and deep, and, so far as I can judge, were never made with so much cause. During a few calls made one day last week amongst a class who are usually tolerably full of work at all seasons, and who have hitherto regarded the Christmas and New Year holiday times as periods of "haymaking," I found one photographer had gone to London to spend Christmas and try to pick up something novel with which on his return he might bring back his *clientèle*; another had laid in a stock of chlorate of potass and manganese, with the intention of earning a few guineas from lantern exhibitions; while a third had looked out the negatives of a few of the most likely of his patrons, and was filling up his time by making enlarged collodion transfers, which he intended to send to the owners in the hope that he would sell sufficient to pay for the cost of production of all, and leave a small margin of profit for himself. He complained, however—and I understand the complaint is general—of the difficulty of getting other than a bluish-black tone, and was very anxious to have it warmed up a little. On reaching home I made a few experiments, and happening to have on hand

[1] *Phot. Arch*, vol. xii., p. 69; ibid., vol. xiii., p. 201; ibid., vol. xv., p. 178; and ibid., vol. xvii., p. 53.
[2] *Phot. Arch*, vol. xiii., p. 201.
[3] *Phot. News*, 1872, p. 471.
[4] *Phot. Archiv*, vol. xiv., p. 111.
[5] *Phot. News*, 1873, p. 127.
[6] *Phot. Monatsblätter*, vol. i, p. 47.

some old "fixing and toning bath"—hyposulphite of soda and gold—it was used to fix the image instead of the usual simple solution of hypo., and the result was just what he required. "Such a tone will not be permanent," some of my readers may say, and it is just possible that the statement may be true; but I have before me now stereoscopic transparencies toned in that way fifteen years ago. They were then a fine warm brown, hardly to be distinguished from the French slides then so popular, and they are now exactly as they were at that period; and if the collodion transfers now being made by my friend retain their beauty for fifteen years he need not bother himself about their after-history.

John Nicol, Ph.D.

ON PROCESSES OF MAP PRODUCTION BY PHOTOGRAPHY.*

Daguerreotype Etching.—Many attempts have been made to engrave the beautiful and delicate photographic image formed on the daguerreotype plate. Thus, Donné simply etched the image with dilute nitric acid, which attacked the silver forming the shadows, leaving the whites protected by the mercury untouched. Grove etched the plates with the aid of the galvanic battery. Fizeau first etched as deeply as possible with dilute muriatic acid, and then, having filled up the hollows with drying oil, deposited gold upon the lights; the oil having then been removed, the plate was bitten with dilute nitric acid. In order to render the silver plate more capable of standing the wear and tear of printing it was covered with a thin film of copper, which could easily be removed and renewed when required.

Other processes were also put forward, but they all failed from the difficulty of biting the image to a sufficient depth and of obtaining the requisite "grain" to enable a large number of impressions to be pulled off. None of them seem to have ever come into practical use, and, like the daguerreotype, they have almost fallen into oblivion.

Though they have the advantage of rapidity, all these processes, in which the image is obtained by etching or biting in with acids or other etching fluids, are open to the objection that for all subjects containing fine and delicate lines the etching and stopping out require almost the same manipulative skill and care as in ordinary engraving, and the processes consequently become expensive to work. There is also a tendency for the lines to become coarse and heavy. In those gelatine processes in which the etching fluid acts through the gelatine it gradually loosens the latter from its support and attacks the parts which should not be bitten at all. These defects are to a great extent obviated in the processes we are now about to consider, in which the printing plates are produced by the electro-deposition of copper on the photographic image.

Electrotyping Methods.—In nearly all the electrotyping methods the printing plate is obtained by depositing copper on a gelatine relief obtained by the agency of light, or on a cast in plaster, gutta-percha, &c., taken from such a gelatine relief.

If a dry film of chromated gelatine on a suitable support be exposed to light under a photographic *cliché*, and then plunged into hot water, the parts acted on by light, being insoluble, will remain on the support in different degrees of relief according to the intensity of the light, while the unexposed parts will be washed away. An image in high relief formed of hard and insoluble gelatine will thus be obtained, from which a cast or electrotype in intaglio may be made.

If, however, instead of using hot water the plate be plunged into cold water, the gelatine will be found to absorb water and swell up in the parts protected from the light, while in the parts acted on by the light it will only slightly absorb the water, and these parts will thus form hollows. The power of absorbing water will also be found to be in exact proportion to the degree of protection from light. In this case an image in low relief is obtained which may also be moulded from, or electrotyped.

Upon these two principles several processes of producing printing plates both for copperplate and letterpress printing have been founded with more or less success.

The first process of the kind was Paul Pretsch's "photogalvanography," invented in 1854. He appears at first to have obtained his plates by coating a glass with gelatine and bichromate, exposing to light, and then washing away the soluble gelatine and taking a mould of the resulting relief, in gutta-percha, from which an electrotype was made in the usual manner.†

This process gave fair results both in line and half-tone, but, owing to the washing away of the soluble gelatine being effected on the side of the film exposed to light, the plates were defective and required a good deal of touching up by skilled engravers, which vastly increased the expense of their production. The process failed as a commercial speculation.

Almost immediately afterwards, in 1855, Poitevin published methods of obtaining plates from the gelatine reliefs obtained by swelling the sensitive films in cold water. Plaster casts were either made from them or the gelatine surface itself was metallised and electrotyped in the usual way.‡

This method produced tolerable results, though the prints were always somewhat coarse, owing to the fact that swollen gelatine will not give the same sharpness as when dry.

* Continued from page 592.
† See *Photographic Journal*, vol. iii., p. 85.
‡ See *Traité de l'Impression Photographique sans sel d'Argent*, p. 49.

Both these processes were more or less unsuitable for reproducing subjects in half-tone—Pretsch's because in the process of washing away the soluble gelatine the lighter half-tones were liable to be lost, and Poitevin's because of the difficulty of keeping the swelling in relative proportion owing to more absorbent parts of the film lying under less absorbent parts. Both processes also failed to give the necessary "grain," without which the proper inking of the engraved plates could not be effected.

Various attempts were made to improve on these processes, but unsuccessfully, until M. Placet showed that it was necessary to adopt in them the same principle of exposing on one side of the gelatine film and developing on the other which, as we have seen, had previously been shown to be necessary for the preservation of the half-tones in the pigment-printing process, and for a similar reason.

M. Placet indicated several ingenious ways of obtaining his results.* They may, however, be briefly summed up as follows:—

A film of chromated gelatine is exposed under a transmitted positive *cliché*, so that the light acts on the under-side of the film; this is done either by covering the collodion side of the *cliché* itself with the sensitive coating, or by using a thin transparent sheet of transfer collodion or mica as a support for it. After exposure to the light the film is soaked in water, whereupon those parts which have been protected from the light swell up in proportion to the amount of the action of light upon them. By treating the mould in relief thus obtained with metallic solutions an electrotype copy in copper may be produced, which can be printed from in the copperplate press.

If a negative *cliché* be used the unaltered gelatine must be dissolved, or a second electrotype must be used.

M. Placet also suggested the employment of a sensitive surface which would become soluble under the influence of light, such as a mixture of gelatine or other colloid with perchloride of iron and tartaric acid, as recommended by Poitevin for pigment printing. In this case the solvent acting on the exposed side hollows out the image, in the same way as an etching fluid does on copper, but with the advantage that each line has only the exact strength given to it by the intensity of the *cliché*. Or the altered parts of the gelatine film may simply be swollen with cold water, producing an image in relief. In either case a mould is taken from the gelatine and electrotyped, or copper may be deposited on the gelatine itself.

By his process M. Placet was able to obtain very perfect gradation of shade in the half-tones of his pictures, with a fine natural grain produced by some means which he did not divulge. He has lately, however, described a method of producing the grain, which consists in plunging the gelatine plate into a solution of bichromate of potash and then treating it with a solution of protosulphate of iron containing acetic acid.† The principle he lays down is first to treat the gelatine with a solvent and then with a solution of some substance that will tan or contract it.

MM. Fontaine, Avet, and Drivet have also proposed similar processes, in which they have partially overcome the difficulty of obtaining a proper "grain" by interposing between the *cliché* and the gelatine film a fine network or an impression of an engraved or *roulette* tint; but these artificial grains have a disagreeable effect, and the methods seem to have fallen into disuse, except for line work and phototypography, which will be described further on. Avet's process is, however, I believe, still in use for producing the maps of the Italian surveys.

Geymet's Method.—The fourth method—that of electrotyping from a gelatine relief obtained by the pigment-printing process—is somewhat similar in principle to Placet's process; but as there are important differences, and the process appears likely to prove of some utility, it may well be treated separately.

According to M. Geymet, who has very fully described the process and all the manipulations of preparing and electrotyping the reliefs in his *Gravure Heliographique*, it was the invention of M. Audra, a French amateur.

Pigmented gelatine tissue is sensitised and exposed to light exactly in the manner previously described for the autotype process. It is transferred to a smooth glass or a polished copperplate, developed in warm water, and when dry is metallised and electrotyped. If the subject is one in line or dot only the above operations are sufficient; but if the subject is a photograph from nature, or any other with gradation of shade, it is necessary to obtain a "grain," and this M. Geymet does by taking a copperplate with its surface grained or engraved with a ruled or *roulette* tint, inking it up in the ordinary way and then covering it with a coating of transfer collodion. When dry, the film of collodion is stripped off the plate and carries with it the impression of the grain. This film is then placed between the *cliché* and the sensitive gelatine film, and serves to break up the shadows in the more transparent parts of the *cliché*.

A similar process has been used at the Depôt de la Guerre, in Belgium, for the reproduction of maps.‡

J. Waterhouse, *Capt.*

(To be continued.)

* See Davanne, *Les Progrés de la Photographie*, p. 185.
† See *Bulletin de la Soc. Franc. de Photographie*, vol. xxiii., p. 130.
‡ See Maës and Hannot, *Traité de Topographie*, &c., p. 330.

ON THINGS IN GENERAL.

Surely this is a "black letter day" in the Publisher's annals! He and we are going to lose the genial spirit who has so long presided over the destinies of this Journal. With a broad and powerful grasp of all subjects connected with our art-science, he has, with the aid of many contributors, upheld the dignity and increased the usefulness of an important technical journal, and for many years has enabled The British Journal of Photography to retain the position of the leading representative of photography in position and circulation. Whether for the troubles of the tyro or the more intricate difficulties of the "old hand," he has ever been ready with aid and advice, as the thousands of replies in the "Answers to Correspondents" so abundantly testify, without ever losing patience, though it must often have been sorely tried. He will have the heartiest good wishes of many thousands of readers for his success in his new sphere, and, for myself, I wish him—God speed!

I do not want to finish the Old Year in a mournful strain of mind, and hence I turn my Pegasus towards the coming man, whose abilities are well known to us all. I offer him my most knightly salutations, assuring him of the goodwill of a multitude of readers. *Le Roi est mort! Vive le Roi!* He knows all the ins and outs of emulsion, quick and slow, and if he had a file of the last year's Journals to ride or tilt at he would not know where to begin.

One of the most striking statements I have read amongst many is that Mr. Warnerke's emulsion is forty times as slow as wet collodion—a fact of Herr Seligman's after which I take the liberty of placing a note of interrogation. In Berlin, however, they seem to know how to "place" the various processes of the day. After noticing that Herr C. Ficke offered to the society his new instantaneous process for the sum of 300 marks, I read that "no wish was expressed to acquire the process for the present at anyrate." Had the ardour of the members been damped by Herr Duby, who, like a true man of science, accompanied his explanations with the remarks that the examples he showed were not to be considered as by any special process, but merely by ordinary processes carefully worked out? What a contrast is continental journalism to English! I presume we have to wait for the foreign journals to "come out" before their report of their societies' meetings can be given here; and in consequence I find that the report of the Berlin society from which I have extracted these facts is just two months' old! What would the readers of the "British" say if they were given news of their own country's societies seven or eight weeks' old?

There are often some good things to be read from the "Edinburgh Society"—a tone of culture generally running through their discussions very pleasant to note; but I was rather surprised that no one traversed the statement of Dr. Hunter that artists "did not pay sufficient attention to the shade of the picture." He also thought photographers should look pre-eminently upon the general form of their subjects, leaving the details to take care of themselves, by which means, he judged, pictures of high practical value would be obtained. Is not "practical" a misprint for "poetical?"

The new artificial light apparatus seems likely to give the Journal a lively time among its testimonial-giving correspondents. Testimonials are mysterious things. I used many years ago to think that persons got their living by giving them. I believe at the present day you can buy them at per quire. I have a recollection of the great rubbing-in process—chalk and pumice—where less than three figures would not be looked at as an exclusive licence price; and there were names appended to enthusiastic testimonials in its advertisements—great names the owners of which, rumour said, had not paid a penny for patent rights, their name being their fortune. "What's in a name?" indeed! A great deal, forsooth!

We are closing the year well. Mr. H. Cooper's "reliable" process and Mr. Willis's platinum process appeal to practical men as real successes. The latter was well served by Mr. Jabez Hughes pointing out the great advance in the process, the withdrawal of the only possible source of suspicion—a companion metal along with the platinum. No one can now suggest a shadow of suspicion that the platinum image could give way. It is like Cæsar's wife; and I predict a great future for it. It is an undoubted fact that the carbon process leaves something still to be desired, even in the best of prints, while a good platinum print has such a velvety transparency of shadow and such purity of colour, while delicate in the whites, that it appeals strongly to the artistic taste. If the new year be only as fertile in real advancement we should do well, I trust it may be a Happy New Year to my readers.

Free Lance.

Our Editorial Table.

The Magic Lantern Manual. By W. J. Chadwick.
London: Warne and Co.

Mr. Chadwick's name is familiar to our readers as that of a gentleman fully conversant with the requirements of the magic lantern, and this in itself will cause his *Manual* to be received with no small degree of confidence. The author is by no means averse to speaking pretty freely as to the places where specialties may be obtained and the firms by whom such matters are manufactured or sold. This course will necessarily give offence to some, but it is very useful to the reader. In the historical part we observe that the sixteenth century-work, "*Ars Magna Lucis et Umbræ*," is attributed to Kerchler. In some historical observations on the same subject made in this Journal about fourteen or fifteen years ago, we attributed, on undoubted authority, the authorship of this work to "Kircher." If, upon subsequent investigation, the name of the author given in Mr. Chadwick's work be found incorrect, it will be well that it be rectified in subsequent editions. While on this subject we may observe that the proof reader has taken a liberty with the name of an esteemed *savant* in spelling it "Doclberner," and that he has mixed up his plain "Mr's." and "Esqr's.," as applied to exhibitors and opticians, in a manner that we know cannot have met with the approval of the author. These notwithstanding, the book is a thoroughly readable one, and contains much interesting matter relating to the magic lantern. In the description of cheap forms of objectives for the lantern, we find one described as composed of "two plano-convex lenses, mounted with the *concave* sides together," the word we have italicised being evidently a misprint for *convex*. Our object in mentioning this is not to point out an error, but to state that if two such lenses be mounted so as to have their convex surfaces nearest to the picture to be magnified they will form a good monochromatic objective; but that if, instead of plain lenses, achromatic ones be made use of, the image will be free from colour, well defined, and sharp to the edge. This description of objective is now extensively employed, although for architectural subjects it is inferior to the portrait combination on account of its giving a slight amount of outward curvature to the marginal perpendiculars of such pictures. The most modern appliances for producing oxygen are here to be found, together with a description of the more recent forms of lanterns.

Men of Mark. Edited by Geo. C. Whitfield.
London: Sampson Low and Co.

In the present (the third) series of his *Men of Mark* Mr. Whitfield has clustered together thirty-six portraits of men of eminence and position, including the Archbishop of York, Anthony Trollope, Lord John Manners, the Bishop of Manchester, Frederick Max Müller, C. R. Darwin, and others of similar renown. We have on former occasions spoken of the excellence of the photographs produced by Messrs. Lock and Whitfield for the *Men of Mark*. Those to be found in the present volume are in every respect quite up to the high standard these eminent artists have set up. The descriptive matter is written with good taste and discrimination.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 1......	Edinburgh	Hall, 5, St. Andrew-square.
,, 1......	Bristol and W. of Eng. Amateur	Museum, Queen's-road.
,, 1......	Photo. Benev. Asso. (Ann. Meet)	160a, Aldersgate-street.
,, 2......	South London	John-street, Adelphi.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held at the Memorial Hall, Albert-square, on Thursday, the 12th instant,—Mr. Charles Adin, President, in the chair.

The minutes of the last meeting having been read and passed, Mr. John E. Macdonald, of Cheetham, was duly elected a member of the Society.

The President read an address elaborating upon the subject of *Negatives and Artistic Photography* [see page 613], prefacing the same by some remarks in reference to the altered positions of officers in the Society. In a very flattering manner he spoke of the long friendship and esteem he had always entertained for the new Secretary, Mr. W. J. Chadwick, and hoped that their unanimous working would be felt and appreciated by the Society.

Mr. John Holding said (as he also belonged to that body of artists whose pictures were produced by aid of the pencil and brush) he felt bound to disagree in some measure with a few points in the President's communication. The opinion *artists* entertained of photographers was that they were mere "mechanical operators," and often too stupid to listen to the advice of an "artist like himself." Even on the occasion of the last excursion of the Society he tried to persuade some of the members to take their pictures from a point of view he thought superior to that which they had chosen, but they would not. They were too clever, and would go on in their own stupid way in spite of his advice; and, although many of their photographs were fair copies of the subjects they were to represent, they wanted "his eye" and "his ideas" to make *pictures*. He could not agree with the President's remark that art was to be classed with rules. "Art was a natural gift, and could not be learned by rules."

The CHAIRMAN said he thought many artists would do well to take a few lessons which photography could easily teach in the study of nature.

The SECRETARY then read a short communication from Mr. M. Noton on *Chadwick's Duplex Gas Lamp* [see page 614], which, it will be remembered, was before the members at the previous meeting.

Mr. Robert Knott, who was unable to attend, sent two silver prints from *carte de visite* negatives which he had printed by the electric light—one printed at twelve inches' distance from the light in fifteen minutes, and the other at twenty-four inches' distance in thirty minutes. The latter was by far the better, and was fully exposed.

Mr. Harrison Gartside also exhibited a print by the electric light exposed under similar conditions.

Mr. GEORGE GREGORY then exhibited a number of excellent portraits, some of which had very pretty effects introduced. He also exhibited the negatives from which the prints were taken. He called attention to the method he had adopted, and, although he claimed no credit for the originality of the "dodge," he thought it might be new to some and interesting to others. At the back of the negatives were gummed in some instances as many as three or four layers of thin tissue paper, portions of which were torn away in places where force in the picture was desired and for introducing high lights, &c., &c. He had found the tissue paper an excellent medium for "touching" upon. He (Mr. Gregory) also exhibited a landscape—a monochrome in oil—which was the subject of some little discussion.

The SECRETARY said that, at the request of several of the members, he had written to Mr. L. Warnerke; but as that gentleman was at present in Russia, Mr. Payne Jennings had kindly sent two 12 × 10 transparencies printed on Warnerke's tissue. These were handed round and examined by the whole of the members with deep interest and admiration. He (the Secretary) briefly explained the development and manipulation of these tissues. Many of the members were so interested as to promise to give the process a fair trial. He then exhibited in action the original oxycalcium lamp, invented by Canon Beechey thirty years ago, for illuminating two or three optical systems of a magic lantern at one time by one light, consisting of a fountain oil lamp with circular wick, in which olive oil is burned with a gentle stream of oxygen gas passed through the centre of the flame. A small ball of lime is suspended over the flame, the lower portion of which, being rendered wholly incandescent, produces a light of great brilliancy.

Mr. W. Watts introduced a very novel and convenient little electric battery of great power for use with the sciopticon, and constructed to fit into the hollow space in the front portion of the base of that instrument, for displaying many beautiful electrical phenomena on the screen, such as the decomposition of water, &c. It was highly appreciated. He also exhibited some other apparatus in connection with electricity and lantern appliances; but as the evening was far advanced he promised to enter more fully into the details on a future occasion.

The Secretary then called attention to three magic lanterns of the oil-burning family sent, by invitation, by their respective makers for inspection and trial. These were carried into the lantern room and lighted; but, in consequence of the late hour of the evening, the trial was postponed till Saturday, December 14, and twelve gentlemen were nominated to attend and act as judges. A short time sufficed to satisfy those present that one of French manufacture, although burning two two-and-a-half-inch wicks, was inferior to the other two—a Newton's lantern fitted with a triple wick refulgent lamp and an improved sciopticon. The latter instrument had a recently-introduced addition by which the picture could, by means of a movable stage and rack and end pinion, be moved from the condenser, thus permitting it to be placed in the more concentrated portion of the converging rays, so that the whole (or nearly so) of the light was allowed to pass through the aperture of the slide.

ON Saturday evening, December 14th, the appointed time for trial, the President and those gentlemen most interested in the lantern gave judgment unanimously in favour of the sciopticon for intensity of illumination, whiteness of light, and better definition.

The trial was conducted in the following manner:—The triple-wick refulgent lantern and the improved sciopticon were placed on an elevated platform, and as the objectives of the two lanterns were not quite of equal foci the lanterns were arranged at such distances that each projected a disc of eight feet diameter with pictures having the same-sized aperture (two and seven-eighth inches). Three slides were procured from Mr. Frank M. Good's negative of the *Lattice Windows of Cairo*, printed in carbon and of equal density and colour, and so nearly alike that experienced photographers were unable to distinguish any difference. The judges, after seeing the lights in each lantern burning satisfactorily, took their seats beneath the lantern platform, so that they were unable to tell by which lantern the picture on the screen was shown; and as each was exhibited alternately they gave judgment, and in every case decided in favour of the sciopticon. The two pictures were next partly covered with a piece of opaque card, so that from each, separately, only one half of the picture was shown (the same side of the slide in each case); but when the two lanterns were allowed to project their semicircular pictures upon the screen at the same time a complete disc was formed. The sciopticon half was again pronounced the brightest and best definition. The pictures were changed about and reversed, with the same results.

PHOTOGRAPHIC SOCIETY OF VIENNA.

THIS Society met on the 15th October,—Herr von Melingo in the chair, in the absence of Dr. Hornig.

The Chairman announced the death of two members of the Society, and then welcomed the guest of the evening, Captain Waterhouse.

On the motion of Herr Luckhardt, M. A. Poitevin was elected an honorary member of the Society.

A letter was then read from Herr Schwier, of Weimar, in which he invited the Society to take part in the proposed German Photographic Conference at Dresden next August.

The rapid processes of Dr. Richard and MM. Boissonnas and Klary came upon the *tapis*, but nothing new respecting either transpired.

Herr LUCKHARDT said he had been astonished by the rapidity of a process worked at Paris by M. Chambay. About five o'clock in the afternoon he had, along with Herr Lewitzky, of St. Petersburg, visited the *atelier* in the Grand Hôtel, which is principally used for taking little children, and there M. Chambay took a portrait of him which by the process Herr Luckhardt himself works would, under the then existing conditions of light, have required an exposure of twenty seconds.

The Secretary intimated that Herr Kroh, of Vienna, had sent samples of the negatives produced by his rapid process, and, though unable to be present at the meeting himself, he had asked the Secretary to invite any members of the Society interested in the subject to visit his studio.

Herr Luckhardt gave some particulars as to his visit to the photographic section of the Paris exhibition.

A number of articles were then laid upon the table for examination, and the meeting was shortly afterwards adjourned.

Correspondence.

THE RECENT MEDAL AWARDS.

To the EDITORS.

GENTLEMEN,—I should be pleased to know what is the object of Colonel Wortley's letters. It appears to me that the correspondence may be summed up in the maxim—*Ex nihilo nihil fit.*

If I correctly understand the Colonel's epistles, he wishes your readers to understand that he did not get prints to his liking. To me, however, it seems that this is exactly what he did do. He evidently wished for prints in haste that he might condemn at leisure, or he would not have summoned to his aid the imaginary gentleman going in such a terrible hurry to India or Afghanistan. The demand, I am told, was so urgent that one might have thought the capture of Shere Ali himself in his capital at Cabul depended upon the delivery of the order.

Only *one* set of prints was ordered by the agency firm, and these are the identical copies in question.—I am, yours, &c., PAYNE JENNINGS.

[The foregoing letter was received too late for insertion in our last number. On the assumption that as it had appeared in another journal last week it would occupy a place in our columns this week, Colonel Wortley has forwarded the following rejoinder, with the publication of which, in abstract, the correspondence must now cease.—EDS.]

To the EDITORS.

GENTLEMEN,—I cannot undertake to follow Mr. Jennings into his attempts at excuse. My knowledge of the matter is limited to my handing my friend's order to a trading firm, and that the order was not correctly executed. * * *—I am, yours, &c.,

Rosslyn House, Grove End-road, N. W., H. STUART WORTLEY.
December 23, 1878.

THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

To the EDITORS.

GENTLEMEN,—In your number for December 20th you quote the report of the last meeting of the Photographic Society of Great Britain from the Society's own journal, and a printers' error in the original report has unfortunately been reproduced in your pages.

In Captain Abney's interesting remarks he is made to say—"He had found by the use of *albumen* great delicacy was produced, though he had chiefly tried it in combination with *albumen*, the result being the formation of a double salt of silver."

I shall be glad to know what word is to be put in the place of one of the "albumens."—I am, yours, &c., HENRY COOPER.

Homehurst, Torquay, December 21, 1878.

THE LUXOGRAPH TESTIMONIAL.

To the EDITORS.

GENTLEMEN,—Permit me to state the facts relating to the luxograph testimonial—so distorted and exggerated by Signor Lombardi in his letter published in your issue last week. Accompanied by my friend and operator, Mr. Ross, I witnessed a demonstration of the luxograph light. Pleased and amused I yet declined to give Messrs. Alder and Clarke a testimonial as to the value of the light, or to purchase the apparatus until it was improved. Two days afterwards, talking over the affair with Mr. Ross, I thought I saw a means to fitting up the luxograph apparatus in an improved manner; and, at my request, Mr. Ross called on Messrs. Alder and Clarke to inform them of my plan, and to request them to supply a *portion* of the apparatus, for which I was willing to pay £15 15s.—a very liberal price for what I wanted. He was also to promise a good—not a "splendid"—testimonial as soon as I had tried the light and personally proved its value; also to supply them with copies of the pictures produced by the aid of the light. This offer was declined with the very significant remark—"As to Mr. Faulkner's testimonial we can get *that*," the meaning of which became evident the following Friday. When the luxograph testimonial written by Signor Lombardi was published I then saw, to my surprise and annoyance, that my name had been put forward without my knowledge, as endorsing Signor Lombardi's enthusiastic and eulogistic opinion of the luxograph.

In consequence of a letter writen to Messrs. Alder and Clarke, one of these gentlemen called on me. I requested him to withdraw my name from the advertisement, and to state that it had been added without my knowledge or approval. This he declined to do for the following reasons:—That he considered Signor Lombardi was my friend, and therefore must have known my sentiments on the subject, and that I had promised to give them a testimonial (when confronted with Mr. Ross he was compelled to admit that this was to have been given conditionally). I explained to him that if the practice of using a man's name without his consent were tolerated there would be an end to all candid expression of opinion, and a system of mistrust would be engendered.

So far from Signor Lombardi being a friend of mine, I had only met him four times, and I knew nothing whatever of him except what he had told me of his ideas and mode of conducting his business; and, judging him from his own words, I should have a very strong objection to having my name associated with him in any affair whatever. The publication of my name, for the purpose of puffing the luxograph, was a piece of gross impertinence on his part, and of sharp practice on the part of Messrs. Alder and Clarke.

During the demonstration I heard Signor Lombardi ask to be taken into partnership, and from the fact that the offices of the Luxograph Apparatus Company are now at his studio it is only reasonable to conclude that an arrangement has been entered into between Messrs. Alder and Clarke and Signor Lombardi; hence his enthusiastic advocacy of the luxograph scheme, and his abuse of me is a mere vehicle for that purpose.

I regret exceedingly to have occupied so much of your space.—I am, yours, &c., ROBERT FAULKNER.

21, *Baker Street, W., December* 24, 1878.

To the EDITORS.

GENTLEMEN,—I note the correspondence which has been addressed to the photographic press by Signor Lombardi and Mr. Robert Faulkner. As my name has been incidentally mentioned therein I feel compelled to trouble you with a few words of explanation.

I was present, in company with the above-named gentlemen, at a demonstration of the new luxograph light, at Messrs. Alder and Clarke's, and was so gratified with the *results* I witnessed that I at once ordered an apparatus. Signor Lombardi's assertion that Mr. Robert Faulkner expressed his admiration of the new light—and that in no unmistakable terms either—is perfectly truthful; and I am somewhat surprised that the latter gentleman should now disavow that which I plainly heard in common with Signor Lombardi.—I am, yours, &c.,

Talbot-road, Blackpool, December 23, 1878. EDWARD GREGSON.

[In addition to the above letters we have also received one from Messrs. Alder and Clarke, in which, among other matter, they say that the fifteen pounds, the testimonial, and the dozen of cabinet portraits offered by Mr. Faulkner for the apparatus was not to include the table or cupboard on which the apparatus stands. But quite enough has now been said about this matter, in which neither our readers nor ourselves can be expected to feel any deep interest. On the general subject of "testimonials" given, or intended to be employed, for advertising purposes, we think it extremely desirable that no names should be introduced in such documents without the persons so employing them having first obtained the sanction of those whose names are introduced. Such step would only be fair and courteous.—EDS.]

Miscellanea.

PLATT'S UNIVERSAL FILTER.—I take pleasure in sending you a cut of my universal filter. I use it as follows:—For varnish or albumen I use an ordinary tin funnel. I first solder a tin band one inch wide on the top, then make the adjustable top of tin to fit in loosely; this consists of another band two inches deep. Spread a piece of cotton flannel over the narrow band on the top of the funnel, with nap side up, then crowd in the wide band, which will draw the flannel snug. The filter is then ready. For varnish, wet the flannel with alcohol; for albumen, use a piece of muslin if the flannel does not filter fast enough. You will at once see it will do all kinds of straining or filtering, as anything, from the coarsest of wire sieving to the finest muslin, can be used. I have used it for collodion, varnish, cream, milk, fat, paint, albumen, honey, and a host of other things I will not mention.—*Phil. Phot.*

PRINTING.—It was but a few years ago that printing was considered to be the most mechanical part of photographic work, and that any boy was capable of doing it after a few weeks' instructions; but, today, what a difference! It is thought now to be one of the most difficult parts of photography. The printer now studies the quality of the negative. He prepares his paper to correspond with the varying conditions of the negative, he masks one part of the background and prints in deeper on another part, as may be required to give the best effect, and in various ways controls the work as it progresses, so as to produce the best possible result. Printing in this way is as much an art as that of negative-making, and requires as much study and skill to do justice to the work. What encouragement does the operator have when he looks at some prints, from a nice, brilliant negative, over-toned, with no brilliancy to them, or some other carelessness on the part of the printer? I do not mean to say that it is the printer's fault that the majority of photographers do not do better work, for in most cases it is that man's fault who makes the negative. He does not study enough; he is getting behind the times. Photography today is not what it was long years ago. It needs as much study and skill as it does to become a lawyer or a doctor.—*Ibid.*

BLACK'S HOMESPUN LIGHTNING PROCESS.—*Nitrate Bath.*—First put the amount of silver to be used into an evaporating dish, and allow it to melt. Then (while it is in a molten state) add to each ounce of silver about three grains of the following salts:—

"*Bromo-iodide.*"

Iodide of lithium	10 grains.
Iodide of ammonium	30 ,,
Iodide of cadmium	2 ,,
Bromide of ammonium	20 ,,
Bromide of cadmium	10 ,,
Bromide of potassium	10 ,,

Put the above into distilled water in a clean evaporating dish, and evaporate to dryness; then let cool. Dissolve the silver in distilled water, forty grains to the ounce, and sun well. To a bath of one gallon, add half a drop of C. P. nitric acid.—*Collodion:* The amount of bromo-iodide mentioned is sufficient for twelve ounces of collodion. Dissolve in alcohol and ether, equal in parts in winter, but in summer there should be a little more of ether used. Cotton to suit your taste—say five grains to the ounce.—*Developer:* Dissolve in sixty ounces of water four ounces of protosulphate of iron. When all is dissolved filter clear into a clean bottle. To use, pour out sixteen ounces; add one and a-quarter ounce of acetic acid and a-quarter ounce of alcohol. Anyone trying the above formula, if they are at all careful, will find it will give good results. Should negatives lack intensity they can be strengthened after fixing, and *washing well* with the following:—Pyrogallic acid one and a-half grain, citric acid one grain, water one ounce. The collodion should be filtered after adding the bromo-iodide through filtered paper, and also after adding the cotton. Use a collodion filter.—*Ibid.*

OBITUARY.—We have received from Mr. V. Sreznievsky, Secretary of the new Photographic Society of St. Petersburg, the following obituary of Mr. W. Carrick, whose pictures attracted so much attention at the late exhibition of the Photographic Society of Great Britain:—Our Society has sustained a severe loss in the death, on the 23rd of November, of our fellow-member, Mr. William Carrick. Of athletic build and stature, and remarkably handsome and expressive in countenance, he also possessed an exceptionally kind heart, a generous nature, and an honesty positively ideal. The hard school of life had not shaken his faith in truth, in virtue, or in the high mission of man. Whenever he confessed his ignorance of any subject there was no false ring, no humility that apeth pride in his confession, and this endeared him still more to those acquainted with his other high qualities. Mr. Carrick was a hard worker all his life, and just managed to make a living. He loved his art for its own sake, and regarded it not as a means, but as an object, of life; and where another of his profession would have made a fortune, this unceasing labourer barely succeeded in making both ends meet. A Scotchman by birth, he received his education at St. Petersburg, where his parents had settled. In accordance with their wish he entered, at the age of seventeen, the Imperial Academy of Arts, in order to study architecture. But he never cared for the profession, although he received his diploma as architect in 1852. He then proceeded to Rome, where he resided three years, applying himself exclusively to painting in water-colours. On his return to St. Petersburg in 1856 he discovered that it was impossible to make a living by water-colour portraits, which have no chance of competing with photography. Accordingly in 1857 he proceeded to Edinburgh, where he studied photography with Mr. Tunny, and there made the acquaintance of Mr. John Macgregor, who joined him in St. Petersburg in 1859, and became his partner. The friendship that arose between them terminated only with Mr. Macgregor's death in 1872. It is questionable whether any photographer has taken as many copies of paintings by Russian artists as Carrick had done, and possibly no one as faithfully represented the originals. He attained these admirable results by being extremely exacting regarding himself, and, if displeased with his work, would take copy after copy until he procured one in all respects satisfactory; in fact, Carrick was an artist-photographer. Photography with him was a means of reproducing and imparting the beautiful. Each one of his photographs proves it. How admirably the standpoint has been chosen! What life there is in his landscapes! And how the Russian peasant, whose likeness he delighted to impress, stands naturally and easily before his lens, and not as though posed for the purpose! Carrick photographed neither views nor types, but reproduced the outer life of the Russian labourer. He never strove for effect; but effect seemed to insinuate itself, as it were, into his pictures. Look at his photographs, and observe what a fulness of life there is in them! Now you have a view of a number of log cottages with their courtyards full of rural implements; here is a picture of a ferry-boat, with carts and peasants, crossing the river—there a number of horses drinking from a trough; here a crowd of urchins and girls, half naked, half wild—there a gathering of peasants. All these are faithfully reflected in Carrick's works as in a mirror. A friend of Carrick, Mr. M. Lokovnin, on whose estate he had done some of his best photographs, writes of him thus:—"Few people know with what love Carrick, though a Scotchman, took pictures of Russian life, and what a priceless addition he has made to Russian ethnography! For several years he had been making a collection (which reached to upwards of three hundred) of types in the county of St. Petersburg, but something drew him to the interior of Russia, to the banks of the Volga, and in 1871, in company with Mr. Macgregor, his partner—as genial and noble a fellow as himself—he paid us a visit in the government of Limbirsk. They worked from morning till night, and enriched their collection not only by taking photographs of Volga scenery in some of the virgin woods of Limbirsk, but also by a number of types of the local races. In 1875 Carrick again paid us a visit, bu alone on this occasion, and added several hundred negatives to his already rich stock. Altogether the number of views and types done by him (cabinet size) reaches seven hundred, representing an enormous expenditure of labour." Many of his pictures taken from nature have been reproduced in the paintings of various artists. Of course Carrick's name was never mentioned. A well-known London illustrated paper also borrowed many of his Russian types without acknowledgment, and had them engraved for its pages, without even alluding to Carrick. His photographs from an ethnographical point of view have not been appreciated in Russia as they deserve to be, probably because his rich collection was never exhibited as a whole, and it is only by viewing it collectively that its merits can be fully valued. It is only then that one observes how complete it is, and how admirably it depicts what Carrick always sought after—the simple and honest side of human nature. He found it in our Russian peasant, and devoted himself to its portrayal. The English were more fortunate than ourselves, for the whole of Carrick's rich collection belonging to Mr. L. Warnerke was shown at the last exhibition of the Photographic Society of Great Britain, and was praised alike by the public and the severest of critics. Carrick died of heart disease, on the night of the 23rd November, in his fiftieth year.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Bath and stand, glass, size 18 × 14½, whole-plate gutta-percha do., half-glass, water-tight, whole-plate bellows camera, and stove for studio, will be given in exchange for half-plate camera and anything useful.—Address, Ward, 54, Brixton-road, S.W.

A patent geyser will be given in exchange for a tourist camera with two double dark slides and lens, in good condition, for plates no smaller than cabinet size, and a glass bath for plates 18 × 14, with dipper.—Address, Harrison, photographer, Falmouth, Cornwall.

ANSWERS TO CORRESPONDENTS.

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

T. C. A.—Yes, you are quite right; but you are, perhaps, not aware that your "quotation" is made from a catalogue which has had three successors.

R. Perry.—We regret our inability to offer any hint at present that would be worth much. We shall make a few experiments soon and record the result.

F. R. S.—See that the camera is capable of being extended forty-three inches. If it fall short in this respect, even to the extent of one inch, another lens will have to be procured.

P. J. F. L.—1. Dissolve the cotton first, and then add the colouring matter.—2. The orange dye is more effective than any of the others mentioned. Make an alcoholic rather than an aqueous solution.

P. L. T. A.—1. Obtain a cylindrical precipitating glass capable of containing about sixteen ounces.—2. See that a temperature of 80° Fahr. is maintained evenly during the whole time the mass is digesting.

Spes.—1. Notwithstanding the excellence of the Kinnear camera it is now being rapidly supplanted by cameras of other forms.—2. We do not consider it would be expedient for us to offer such an opinion as you wish.—3. Both possess an equal degree of rapidity.

J. Bastie.—Your query—"What is a photographic clock?" puzzled us a good deal at first, and might have been doing so still had we not, when turning over the advertising pages of an American journal, come "right across" the name. It is simply an ordinary clock, having a large seconds' hand.

Vero.—In answer to your first query, we have not the specification at hand for reference; but, in reply to the second question, the difference between the two is so little that it can only be discovered by an expert. Of the more recent production we are quite unable to speak from personal acquaintance. One word—avoid density in the materials.

R. M.—The hydrometer (or argentometer) is a very effective and tolerably accurate means by which to ascertain the strength of a silver bath to which no other salts have been added; but it will scarcely answer for such a delicate analytical purpose as that mentioned. In this case recourse must be had to the volumetric method of making the quantitative test.

W. F. R.—For the purpose intended the collodion must be very old and red, otherwise the transparencies will be wanting in force and purity. It may, however, be well to try the effect of the addition of tincture of iodine to the collodion, this addition being carried to such an extent as to render it of a port wine colour. Bromine may also be used with advantage.

Old Subscriber.—1. The *easiest* method for obtaining a warm brown tone is the application of bichloride of mercury followed by sulphide of ammonium; but, unfortunately, it is so far from being the *best* that we always sound a note of warning against its use. Try acetic acid and albumen in the developer.—2. Carbon tissue can be used in the solar camera.—3. Mr. Solomon, of Red Lion-square, publishes a manual on enamel photography, price five shillings.

W. L. R.—Your queries had been mislaid, hence the delay in replying:—1. Try the effect of nailing the cover to the inside of the box with small tacks, and to the erect back, also to the diagonal strut behind as far up as the upright rod shown in the picture. This will allow of the cover being thrown back for packing.—2. Any albumen on the back of the plate will be liable to injure the bath. If kept dry the plates will keep indefinitely.—3. Everything depends upon the method by which the plate has been prepared.

M. Boissonas (Geneva).—Received. In our next.

South London Photographic Society.—The first meeting for the session 1879 will take place on Thursday next, January 2nd, in the Rooms of the Society of Arts, Adelphi, at eight o'clock, when the evening will be devoted to a lantern exhibition—principally views of the Paris Exhibition, by Mr. F. York. Further information can be obtained of the Hon. Sec., H. Garrett Cocking, High-road, Lee, S.E.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For the two Weeks ending December 24, 1878.
These Observations are Taken at 8.30 a.m.

Dec.	Bar.	Max. Tem. Sun.	Max. Tem. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Wind.	Remarks.
12	29·83	—	31	27	—	29	NW	Foggy
13	29·66	—	31	26	—	28	NE	Foggy
14	29·63	—	31	23	—	27	E	Foggy
16	29·58	—	37	31	33	35	NW	Foggy
17	29·48	—	35	25	—	28	N	Foggy
18	29·37	—	39	26	35	36	W	Bright
19	29·19	—	40	31	33	35	W	Overcast
20	29·51	—	35	30	32	33	NW	Foggy
21	29·80	—	35	28	—	30	N	Overcast
23	29·86	—	35	23	—	26	NW	Overcast
24	29·36	—	—	23	—	27	NW	Hazy

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